Request for an Incidental Harassment Authorization Under the Marine Mammal Protection Act

Bremerton and Edmonds Ferry Terminals
Dolphin Relocation Project
Washington State Department of Transportation
Ferries Division

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Submitted To:

National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway
Silver Spring, Maryland 20910-3226

Prepared By:

Washington State Department of
Transportation
Jeff Dreier
310 Maple Park Avenue SE
Olympia, Washington 98504-7331
dreierj@wsdot.wa.gov

Washington State Ferries
Richard D. Huey
2901 Third Avenue, Suite 500
Seattle, Washington 98121-3014
206-515-3721
hueyr@wsdot.wa.gov

Note: Thanks to Jim Laughlin of WSDOT for analyzing the data to provide site specific threshold zones for this project.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

Abbreviations and Acronyms

BMP	best management practices
CA-OR-WA	California-Oregon-Washington
CFR	Code of Federal Regulations
dB	decibels
DPS	Distinct Population Segment
DPS	dynamic positioning system
Ecology	Washington State Department of Ecology
ESA	Endangered Species Act
FR	Federal Register
HPA	Hydraulic Project Approval
Hz	hertz
IHA	Incidental Harassment Authorization
IWC	International Whaling Commission
kHz	kilohertz
kJ	kilojoules(s)
km	kilometer(s)
m	meters
MLLW	Mean Lower Low Water
MHHW	Mean Higher High Water
MM	mitigation measure
MMPA	Marine Mammal Protection Act of 1972
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanographic Atmospheric Administration
NTU	nephelometric turbidity units
OHW	ordinary high water
PBR	Potential Biological Removal
PSAMP	Puget Sound Ambient Monitoring Program
RCW	Revised Code of Washington
RL	Received Level

RMS	root mean square
SAR	Stock Assessment Report
SEL	Sound Exposure Level
SL	Source Level
SPCC	Spill Prevention, Control, and Countermeasures Plan
SPL	Sound Pressure Level
TL	Transmission Loss
TTS	Temporary Threshold Shift
µPa	micro-Pascals
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
WSF	Washington State Department of Transportation Ferries Division
ZOE	Zone of Exclusion
ZOI	Zone of Influence

1.0 Description of the Activity

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 Introduction

The Washington State Department of Transportation (WSDOT) Ferries Division (WSF) operates and maintains 19 ferry terminals and one maintenance facility, all of which are located in either Puget Sound or the San Juan Islands (Georgia Basin) (Figure 1-1). Since its creation in 1951, WSF has become the largest ferry system in the United States, operating 22 vessels on 10 routes with over 500 sailings each day.

Figure 1-1 Washington State Ferry System Route Map

To improve, maintain, and preserve the terminals, WSF conducts construction, repair and maintenance activities as part of its regular operations. One of these projects is the relocation of dolphins at the Bremerton and Edmonds Ferry Terminals, and is the subject of this Incidental Harassment Authorization (IHA) request. The proposed project will occur in marine waters that support several marine mammal species. The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals, which is defined as to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a)(5)(D) allows for the issuance of an IHA, provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals.

The project's timing and duration and specific types of activities (such as pile driving) may result in the incidental taking by acoustical harassment (Level B take) of marine mammals protected under the MMPA. WSDOT/WSF is requesting an IHA for 11 marine mammal species that may occur in the vicinity of the project: harbor seal, northern elephant seal, California sea lion, Steller sea lion, killer whale (southern resident and transient), harbor porpoise, Dall's porpoise, long-beaked common dolphin, gray whale, humpback whale, and Minke whale.

1.2 Project Purpose and Need

The WSDOT/WSF are proposing to relocate one dolphin to improve safety at each of the Bremerton and Edmonds ferry terminals. The Olympic Class ferries have an atypical shape, which at some terminals causes the vessel to make contact with the inner dolphin prior to the stern reaching the intermediate or outer dolphin. This tends to cause rotation of the vessel away from the wingwalls and presents a safety issue. The project will reduce the risk of landing issues for Olympic Class ferries at the Bremerton and Edmonds ferry terminals.

1.3 Project Setting and Land Use

The Bremerton Ferry Terminal is located in the city of Bremerton, east of the Navy shipyard. Bremerton is on the shoreline of Sinclair Inlet, south of Bainbridge Island. Located in Kitsap County, Washington, the terminal is located in Section 24, Township 24 North, Range 1 East. The Edmonds Ferry Terminal is located in the city of Edmonds, along the downtown waterfront. Edmonds is in Snohomish County, approximately 15 miles north of Seattle. The terminal is located in Section 23, Township 27 North, Range 3 East (Figure 1-2). Land use near both ferry terminals is a mix of residential, commercial, industrial, and open space and/or undeveloped lands.

1.4 Project Description

The WSDOT/WSF are proposing to relocate two dolphins to improve safety at the Bremerton and Edmonds ferry terminals.

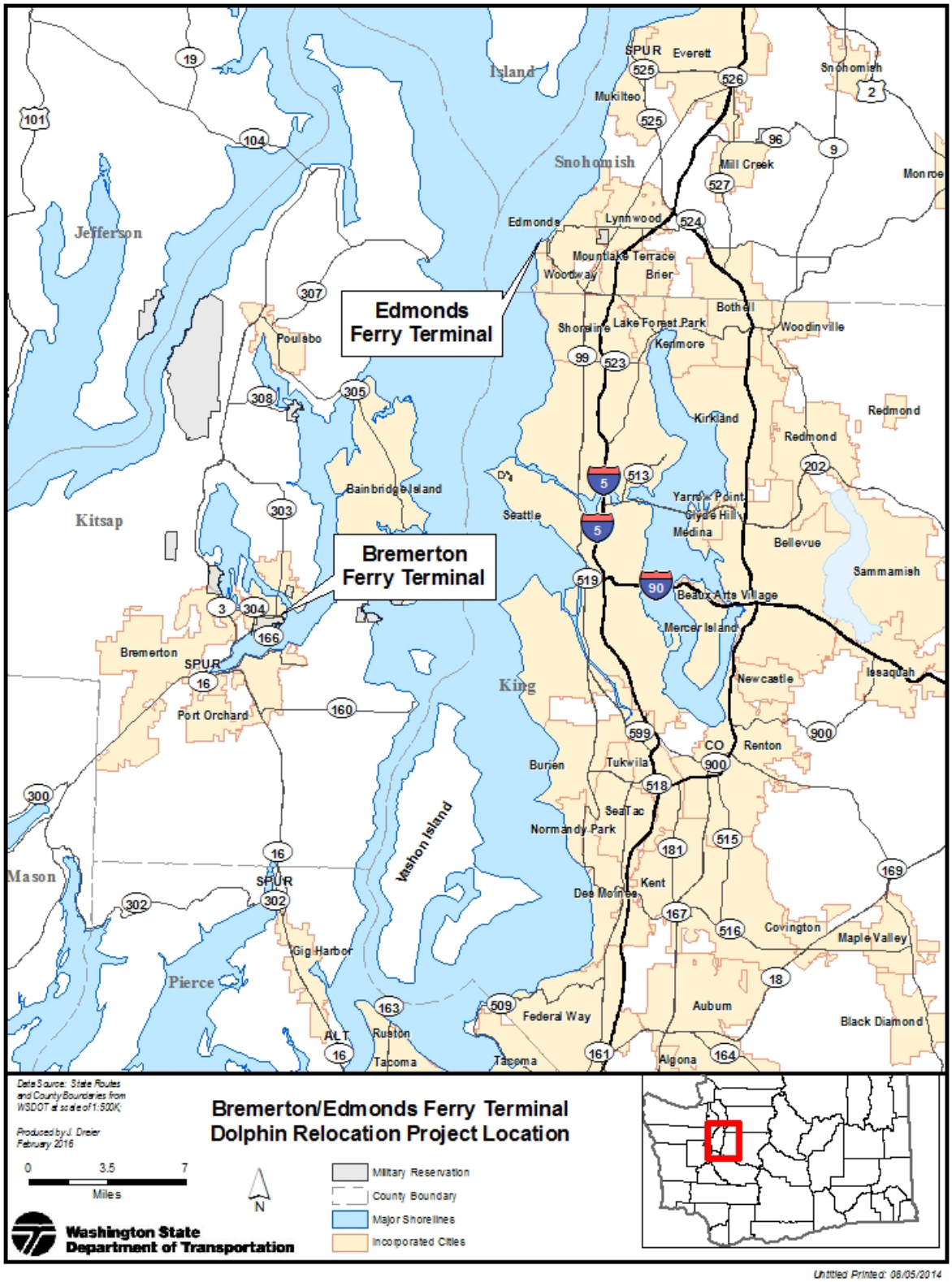


Figure 1-2. Location of Bremerton and Edmonds ferry terminals and nearby features.

1.4.1 Project Elements - Bremerton

The locations of the Bremerton Ferry Terminal project elements are shown in Figure 1-3. Plan sheets are provided in Appendix A.

Figure 1-3. Locations of project elements at the Bremerton Ferry Terminal portion of the project.

This project will reduce the risk of landing issues for Olympic Class ferries at Bremerton Ferry Terminal's primary slip by replacing the left outer dolphin to address the atypical shape of the Olympic Class vessels.

The following construction activities (in sequence) are anticipated for the Bremerton Ferry Terminal:

- Install one temporary 36-inch diameter steel indicator pile with a vibratory hammer. The temporary indicator pile will be used as a visual landing aid reference for vessel captains during construction. It will be relocated to become a fender pile for the new dolphin.
- Remove the existing left outer dolphin that consists of six 36-inch diameter steel pipe piles with a vibratory hammer and/or by direct pull and clamshell removal.
- Using a vibratory hammer, install three 30-inch steel pile reaction piles. This is a back group of piles that provide stability to the dolphin.
- Install a concrete diaphragm (the diaphragm joins the piles at their tops), then use a vibratory hammer to install the remaining four 30-inch reaction piles.
- Using a vibratory hammer, install three 36-inch diameter steel pipe fender piles; install fenders and attach rub panels to the fender piles. Fender piles absorb much of the energy as the ferry vessel makes contact with the dolphin.

- Using a vibratory hammer, remove the 36-inch temporary indicator pile and install it as the last remaining fender pile along with the fender and fender panel.

1.4.2 Project Elements – Edmonds

This project will reduce the risk of landing issues for Olympic Class ferries at Edmonds Ferry Terminal's primary slip by relocating the right inner dolphin. The locations of the Edmonds Ferry Terminal project elements are shown in Figure 1-4. Plan sheets are provided in Appendix A.

Figure 1-4. Locations of project elements at the Edmonds Ferry Terminal portion of the project.

The following construction activities (in sequence) are anticipated for the Edmonds Ferry Terminal:

- Install one temporary 36-inch diameter steel indicator pile with a vibratory hammer. The temporary indicator pile will be used as a visual landing aid reference for vessel captains during construction.
- Using a vibratory hammer, install one 30-inch reaction pile.

- Remove the concrete diaphragm, and install it in the new location.
- Cut off three reaction plies at the mudline.
- Using a vibratory hammer, install the two remaining reaction piles through the diaphragm.
- Using a vibratory hammer, remove three 36-inch steel pipe fender piles and reinstall them in their new locations.
- Install fenders and attach rub panels to the fender piles.
- Using a vibratory hammer, remove the 36-inch temporary indicator pile (this portion of the project will not reuse the indicator pile).

1.4.3 Durations

The time it will take to complete pile driving depends on the difficulty in penetrating the substrate during pile installation. It is assumed that only one vibratory hammer will be in operation at a time. Durations are conservative, and the actual amount of time to install and remove piles will likely be less. Duration estimates of each of the pile driving/removal elements follow:

- Vibratory driving of each temporary 36-inch diameter steel indicator pile will take approximately 20 minutes, with one pile installed per day over two days.
- Vibratory removal of each temporary 36-inch diameter steel indicator pile will take approximately 15 minutes, with one pile removed per day over two days.
- Vibratory removal of each of the nine 36-inch diameter steel piles will take approximately 15 minutes, with up to three piles removed per day over three days.
- Vibratory driving of each of the seven 36-inch diameter steel piles will take approximately 20 minutes, with up to three piles installed per day over three days.
- Vibratory driving of each of the ten 30-inch diameter steel piles will take approximately 20 minutes, with up to three piles installed over four days.

The maximum anticipated number of days for vibratory pile driving is nine, with an estimated five days for pile removal. Tables 1-1 and 1-2 summarize the project's pile removal and installation durations at each terminal.

In-water construction at the Bremerton Ferry Terminal will commence after October 1, and is planned during the August 1, 2018 to February 15, 2019 in-water work window for Tidal Reference Area 5. In-water construction at the Edmonds Ferry Terminal will commence October 1, and is planned during the July 15, 2018 to February 15, 2019 in-water work window for Tidal Reference Area 6 (WAC 220-660-330). The on-site work will last approximately 60 calendar days, with total estimated pile driving and removal requiring a maximum of 5.65 hours over nine days at Bremerton, and 3.3 hours over five days at Edmonds.

Table 1-1. Summary of pile removal and installation durations at the Bremerton Ferry Terminal.

Project Element	Diameter	Pile Type	Install or Remove	Method	Number of Piles	Duration per Pile (minutes)	Duration (hours)	Rate (piles/ day)	Duration (days)
Indicator Pile	36-in	Steel	Install	Vibratory	1	20	0.3	1	1
		Steel	Remove	Vibratory	1	15	0.25	1	1
Existing Dolphin Removal	36-in	Steel	Remove	Vibratory	6	15	1.50	3	2
Relocated Dolphin Installation	36-in	Steel	Install	Vibratory	4	20	1.3	3	2
	30-in	Steel	Install	Vibratory	7	20	2.3	3	3
Totals							5.65		9

Table 1-2. Summary of pile removal and installation durations at the Edmonds Ferry Terminal.

Project Element	Diameter	Pile Type	Install or Remove	Method	Number of Piles	Duration per Pile (minutes)	Duration (hours)	Rate (piles/ day)	Duration (days)
Indicator Pile	36-in	Steel	Install	Vibratory	1	20	0.3	1	1
		Steel	Remove	Vibratory	1	15	0.25	1	1
Existing Dolphin Removal	36-in	Steel	Remove	Vibratory	3	15	0.75	3	1
Relocated Dolphin Installation	36-in	Steel	Install	Vibratory	3	20	1.0	3	1
	30-in	Steel	Install	Vibratory	3	20	1.0	3	1
Totals							3.3		5

1.5 Pile Driving and Removal Techniques

The proposed project has one element involving noise production that may impact marine mammals: vibratory hammer driving and removal.

1.5.1 Vibratory Hammer Driving and Removal

Vibratory hammers are commonly used in steel pile driving where sediments allow and involve the same vibratory hammer used in pile removal. The pile is placed into position using a choker and crane, and then vibrated between 1,200 and 2,400 vibrations per minute (Figure 1-5). The vibrations liquefy the sediment surrounding the pile allowing it to penetrate to the required seating depth, or to be removed. The type of vibratory hammer that will be used for the project will likely be an APE 400 King Kong (or equivalent) with a drive force of 361 tons.

Figure 1-5. Driving a steel pile with a vibratory hammer.

1.6 Sound Levels

1.6.1 Reference Underwater Vibratory Sound Source Levels

The project includes vibratory driving of 30-inch diameter steel piles, and driving and removal of 36-inch diameter steel piles. Based on in-water measurements, vibratory driving or removal of 30-inch steel piles generated 174 dB_{RMS} at 10 meters (WSF 2014). Vibratory pile driving of a 36-inch steel pile generated 177 dB_{RMS} measured at 10 meters (WSF 2014). These source levels will be used for both Level A and B modeling and take analysis. It is assumed that vibratory removal of 36-inch steel piles will generate the same source level as vibratory installation.

Table 1-3 summarizes in-water construction continuous noise levels associated with each pile size at the Bremerton and Edmonds ferry terminals.

Table 1-3. Summary of project-generated continuous noise.

Project Element	Estimated Noise Level	Number of Piles	Duration per Pile (minutes)	Total Pile Noise Duration
Installation of 30-inch steel piles	174 dB_{RMS} at 10m (install)	10	20	3.3 hours
Installation/removal of 36-inch steel piles	177 dB_{RMS} at 10m (install)	9	20	3 hours
	177 dB_{RMS} at 10m (remove)	11	15	2.75 hours

1.6.1.1 Vibratory Driving and Removal Level A Injury Take Analysis

Isopleths for injury zones are based on peak SPL (Lpk) and cumulative SEL (LE) dual criteria, whichever zone is larger.

For peak SPL (Lpk), distances to marine mammal injury thresholds were calculated using a simple geometric spread using a transmission loss coefficient of 15:

$$SL_{Measure} = EL + 15\log_{10}(R - D_{Measure})$$

where $SL_{Measure}$ is the measured source level in dB re 1 µPa, EL is the specific received level of threshold, $D_{Measure}$ is the distance (m) from the source where measurements were taken, and R is the distance (radius) of the isopleth to the source in meters.

For cumulative SEL (LE), distances to marine mammal exposure thresholds were computed using spectral modeling that incorporates frequency specific absorption. First, representative pile driving sounds recorded during vibratory pile driving at the Edmonds Ferry Terminal were used to generate power spectral densities (PSDs), which describe the distribution of power into frequency components composing that sound, in 1-Hz bins. Parserval's theorem, which states that the sum of the square of a function equals to the sum of the square of its transform, was applied to ensure that all energies within a given period of time for vibratory pile driving were captured through the fast Fourier transform, an algorithm that converts the signal from its original domain (in this case, time series) to a representation in frequency domain. For vibratory pile driving, broadband PSDs were generated from a series of continuous 1-second SEL. Broadband PSDs were then adjusted based on weighting functions of marine mammal hearing groups (Finneran 2016) by using the weighting function as a band-pass filter.

For vibratory pile driving, cumulative exposures were computed by 1-second noise exposure by the duration need to drive on pile, then by the number of piles to be driven in a given day, as shown in the equation below:

$$E_{sum} = \sum_{i=1}^{N} E_{1s,i} \Delta t_i$$

where E_{1s} is the 1-second noise exposure, and Δt is the duration needed to install 1 pile by vibratory driving.

Frequency-specific transmission losses, TL(f), were then computed using practical spreading along with frequency-specific absorption coefficients that are computed with nominal seawater property (i.e., salinity = 35 psu, pH = 8.0) at 15oC at the surface by:

$$TL(f) = 15\log_{10}(R) + \alpha(f)R/1000$$

where α(f) in dB/km, and R is the distance (radius) of the specific isopleth to the source in meters. For broadband sources such as those from pile driving, the transmission loss is the summation of the frequency-specific results.

1.6.1.2 Vibratory Driving Level B Disturbance Take Analysis

The threshold value for Level B acoustical harassment of marine mammals exposed to continuous noise sources is 120 dB_{RMS} (NMFS 2016a). NMFS requires the use of the practical spreading model to calculate Level B take distances, where transmission loss (TL):

$$TL = 15Log\ (R1/R2)$$

Where R1 is the range or distance at which transmission loss is estimated, and R2 is the range or distance of the known or measured sound level.

Conversely, the distance to where the source sound level drops off to the 120 dB_{RMS} threshold level can be calculated by rearranging the terms in the equation above giving:

$$R1 = R2*10^{(TL/15)}$$

1.6.2 Background Noise

Background noise is the in-water sound level absent of the proposed activity (pile driving and removal), while ambient in-water sound levels are absent of all human activity (NMFS 2009). Various factors contribute to background noise levels in marine waters: ship traffic, depth sounders, waves, wind, rainfall, current fluctuations, chemical composition and biological sound sources (e.g., marine mammals, fish, shrimp) (Carr et al. 2006).

If background noise levels are above the Level B marine mammal 120 dB_{RMS} threshold level, then pile driving/removal attenuation distances are calculated to that background level instead of the threshold level.

For example, if the background noise level was 130 dB_{RMS}, then animals would not be exposed to "harassment level" sounds at less than 130 dB_{RMS} as those sounds no longer dominate; they are essentially part of the background. In this example, the 130 dB_{RMS} isopleth becomes the new project threshold for Level B take of marine mammals. If background sound levels are less than the threshold value for Level B acoustical harassment of marine mammals exposed to continuous noise sources, then the 120 dB_{RMS} threshold level can be used to determine the harassment zone of influence.

Background sound level data were collected at the Edmonds Ferry Terminal, and plotted per NMFS guidelines (NMFS 2009) within relevant frequency ranges (Table 1-4). The lowest frequency weighted background noise level was 119 dB_{RMS}, and the highest was 123 dB_{RMS}. Given that only one background level is below the threshold level, and by only 1 dB, there is no significant advantage gained by calculating one zone for high frequency cetaceans, and all other zones to the threshold level. For this application all Level B zones of influence will be calculated to the 120 dB_{RMS} threshold level.

In-water background sound level data are not available for the Bremerton Ferry Terminal, therefore all Level B zones of influence for Bremerton will be calculated to the 120 dB_{RMS} threshold level.

Table 1-4. Background sound level results, Edmonds Ferry Terminal (WSDOT 2011)

Frequency Range	Functional Hearing Group	Daytime 50% Cumulative Density Function (dB)
7 Hz to 20 kHz	Low Frequency Cetaceans	123
75 Hz to 20 kHz	Phocid Pinnipeds	121
100 Hz to 20 kHz	Otarrid Pinnipeds	Not measured*
150 Hz to 20 kHz	Mid Frequency Cetaceans	120
200 to 20 kHz	High Frequency Cetaceans	119
1 Hz to 20 kHz	Broadband Background	123

*WSF collection of otarrid pinniped data did not begin until 2014.

1.6.3 Airborne Reference Sound Source Levels

While in-air sounds are not applicable to cetaceans, they are to pinnipeds, especially harbor seals when hauled out. Loud noises can cause hauled out seals to panic back into the water, leading to disturbance and possible injury to stampeded pups.

Based on in-air measurements at the Coupeville Ferry Terminal, vibratory driving of a 30-inch steel pile generated a maximum of 96.9 dB_{RMS} (unweighted) at 50 ft. (Laughlin 2010b). It is assumed that in-air noise generated during vibratory driving of 36-inch diameter steel piles will generate the same source level (96.9 dB_{RMS}). It is also assumed that vibratory removal of these piles will generate the same source level.

1.6.4 Attenuation to NMFS Thresholds

NMFS has established disturbance and injury noise thresholds for marine mammals (Table 1-5). Determining the area(s) exceeding each threshold level (the zone of influence [ZOI]/zone of exclusion [ZOE]) is necessary to estimate the number of animals for the Level B acoustical harassment take request, and to establish a monitoring area. No Level A take is requested for this project.

Table 1-5. Marine Mammal Injury and Disturbance Thresholds for Underwater and Airborne Noise

Marine Mammals	Airborne Noise Level at which Pinniped Haul-out Disturbance has been Documented	Vibratory Driving In-water Disturbance Threshold	Vibratory Driving In-water Injury Threshold
Low-frequency cetaceans	N/A	120 dB_{RMS}	199 dB SEL_{cum}
Mid-frequency cetaceans	N/A	120 dB_{RMS}	198 dB SEL_{cum}
High frequency cetaceans	N/A	120 dB_{RMS}	173 dB SEL_{cum}
Phocid pinnipeds	90 dB_{RMS} (unweighted) for harbor seals	120 dB_{RMS}	201 dB SEL_{cum}
Otariid pinnipeds	100 dB_{RMS} (unweighted) for all other pinnipeds	120 dB_{RMS}	219 dB SEL_{cum}

1.6.4.1 Vibratory Driving of 30-inch Steel Piles (Bremerton)

The 120 dB_{RMS} underwater disturbance threshold sound level will be used to establish the vibratory driving disturbance ZOI. The NOAA/NMFS practical spreading model (sound transmission loss of 4.5 dB per doubling distance) was used to determine the distance where underwater sound will attenuate to the 120 dB_{RMS} disturbance threshold. The injury ZOEs were determined using the methods described in Section 1.6.1.1 (Laughlin, pers. comm. 2017).

The underwater ZOI and ZOEs for vibratory driving of 30-inch steel piles at the Bremerton are defined below, and shown in Figure 1-6:

- ZOI: the distance where noise attenuates to the 120 dB_{RMS} disturbance threshold level for **all marine mammals** = 39.8 km/24.7 miles (or nearest landfall = 7 km/4.4 miles). Due to the constraints of land, the area of this ZOI is 13.2 square kilometers.
- ZOE: the **mid-frequency cetacean, phocid and otariid pinniped** injury threshold = 10 m/33 ft.
- ZOE: the **low-frequency and high-frequency cetacean** injury threshold = 25 m/82 ft.

1.6.4.2 Vibratory Driving and Removal of 36-inch Steel Piles (Bremerton)

The 120 dB_{RMS} underwater disturbance threshold sound level will be used to establish the vibratory driving and removal disturbance ZOI. The NOAA/NMFS practical spreading model (sound transmission loss of 4.5 dB per doubling distance) was used to determine the distance where underwater sound will attenuate to the 120 dB_{RMS} disturbance threshold. The injury ZOEs were determined using the methods described in Section 1.6.1.1 (Laughlin, pers. comm. 2017).

The underwater ZOI and ZOEs for vibratory driving and removal of 36-inch steel piles (3 piles/day) are defined below:

- ZOI: the distance where noise attenuates to the 120 dB_{RMS} background/disturbance threshold level for **all marine mammals** = 63.1 km/39.2 miles (or nearest landfall = 7 km/4.4 miles). Due to the constraints of land, the area of this ZOI is 13.2 square kilometers.
- ZOE: the **mid-frequency cetacean, phocid and otariid pinniped** injury threshold = 10 m/33 ft.
- ZOE: the **low-frequency cetacean** injury threshold = 25 m/82 ft.
- ZOE: the **high-frequency cetacean** injury threshold = 35 m/115 ft.

1.6.4.3 Vibratory Pile Driving/Removal Zones of Exclusion (Bremerton)

The purpose of the safety zone/Zone of Exclusion (ZOE) is to ensure that 30-inch and 36-inch steel vibratory pile driving/removal is shut down before Level A take occurs.

In order to simplify monitoring, the following conservative ZOEs will be used (Figure 1-6):

- ZOE-1: the **phocid and otariid pinniped** injury threshold = 10 m/33 ft.
- ZOE-2: the **mid, low and high-frequency cetacean** injury threshold = 35 m/115 ft.

The ZOEs will be fully monitored and vibratory driving/removal will be shut down at the approach of any pinniped to ZOE-1 or cetacean to ZOE-2 (see Appendix B, Marine Mammal Monitoring Plan).

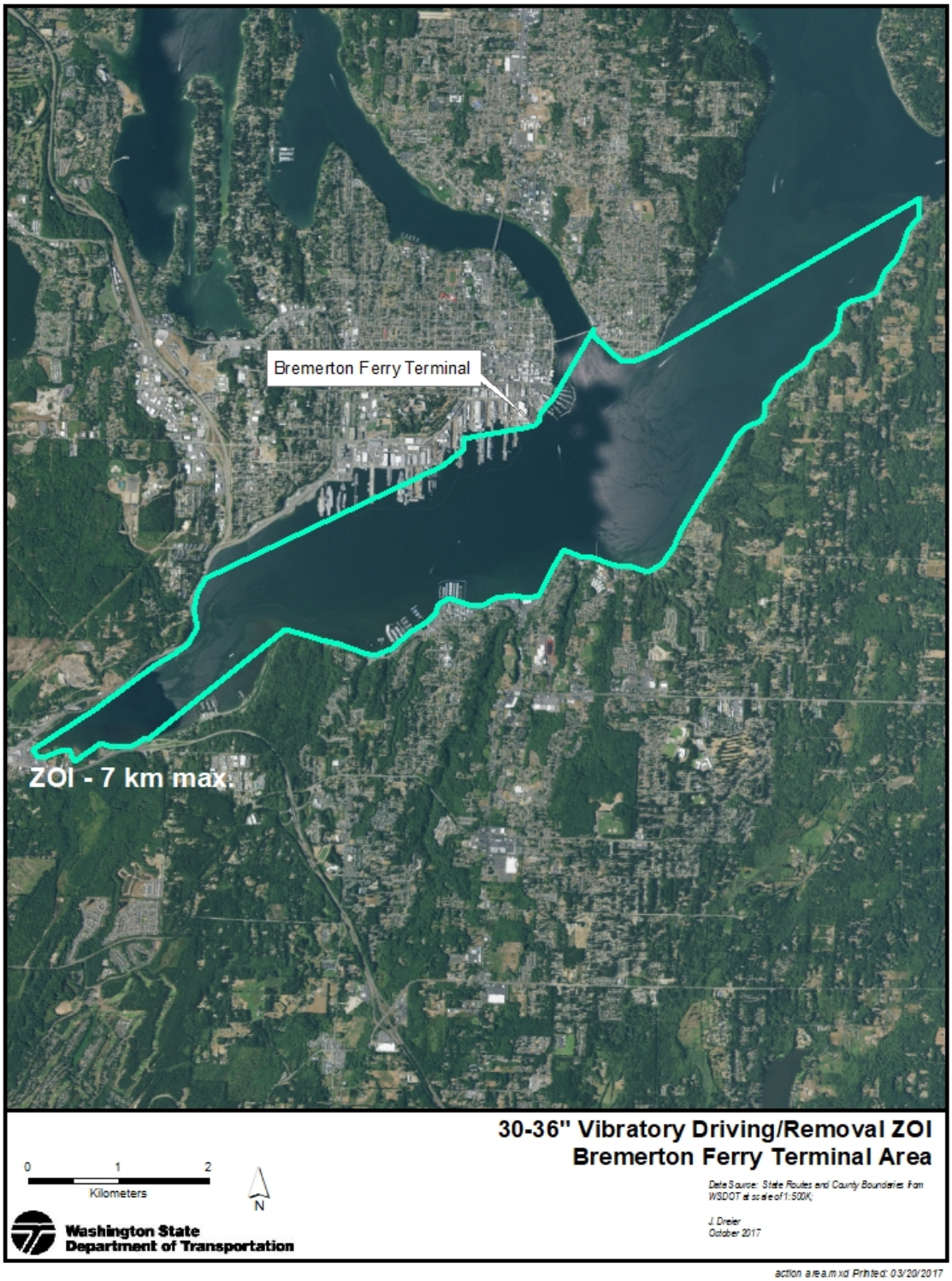


Figure 1-6. Bremerton ZOI

Figure 1-7. Bremerton ZOEs

1.6.4.4 Vibratory Driving of 30-inch Steel Piles (Edmonds)

The underwater ZOI and ZOEs for vibratory driving of 30-inch steel piles at the Edmonds portion of the project are defined below, and shown in Figure 1-7. The injury ZOEs were determined using the methods described in Section 1.6.1.1 (Laughlin, pers. comm. 2017).

- ZOI: the distance where noise attenuates to the 120 dB_{RMS} disturbance threshold level for **all marine mammals** = 39.8 km/24.7 miles (or nearest landfall). Due to the constraints of land, the area of this ZOI is 351 square kilometers.
- ZOE-1: the **mid-frequency cetacean, phocid and otariid pinniped** injury threshold = 10 m/33 ft.
- ZOE-2: the **low-frequency and high-frequency cetacean** injury threshold = 25 m/82 ft.

1.6.4.5 Vibratory Driving and Removal of 36-inch Steel Piles (Edmonds)

The underwater ZOI and ZOEs for vibratory driving and removal of 36-inch steel piles are defined below and shown in Figure 1-7. The injury ZOEs were determined using the methods described in Section 1.6.1.1 (Laughlin, pers. comm. 2017).

- ZOI: the distance where noise attenuates to the 120 dB_{RMS} background/disturbance threshold level for **all marine mammals** = 63.1 km/39.2 miles (or nearest landfall). Due to the constraints of land, the area of this ZOI is 351 square kilometers.
- ZOE: the **mid-frequency cetacean, phocid and otariid pinniped** injury threshold = 10 m/33 ft.
- ZOE: the **low-frequency cetacean** injury threshold = 25 m/82 ft.
- ZOE: the **high-frequency cetacean** injury threshold = 35 m/115 ft.

1.6.4.6 Vibratory Pile Driving/Removal Zones of Exclusion (Edmonds)

The purpose of the safety zone/Zone of Exclusion (ZOE) is to ensure that 30-inch and 36-inch steel vibratory pile driving/removal is shut down before Level A (injury) take occurs.

In order to simplify monitoring, the following conservative ZOEs will be used (Figure 1-6):

- ZOE-1: the **phocid and otariid pinniped** injury threshold = 10 m/33 ft.
- ZOE-2: the **mid, low and high-frequency cetacean** injury threshold = 35 m/115 ft.

The ZOEs will be fully monitored and vibratory driving/removal will be shut down at the approach of any pinniped to ZOE-1 or cetacean to ZOE-2 (see Appendix B, Marine Mammal Monitoring Plan).

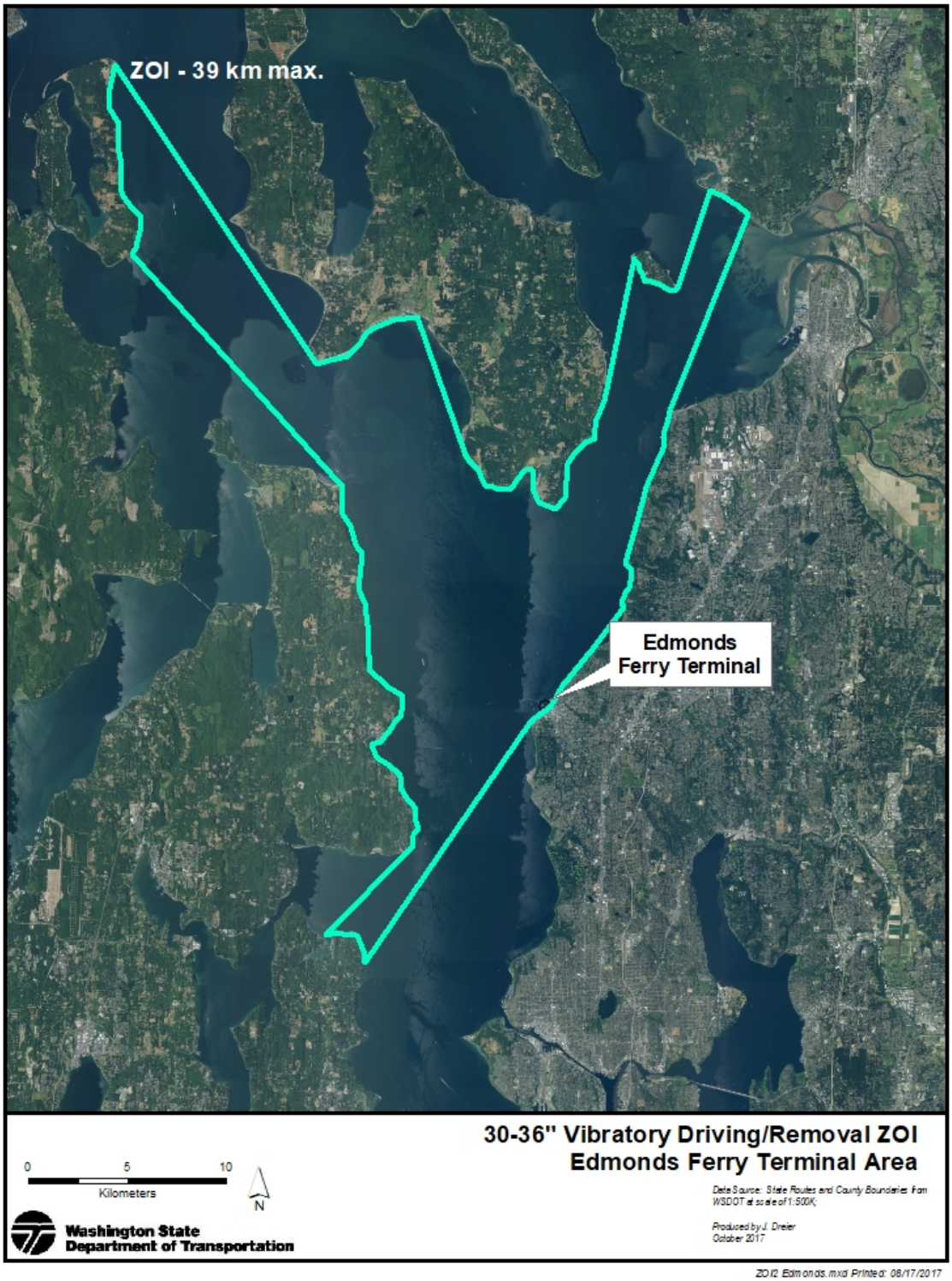
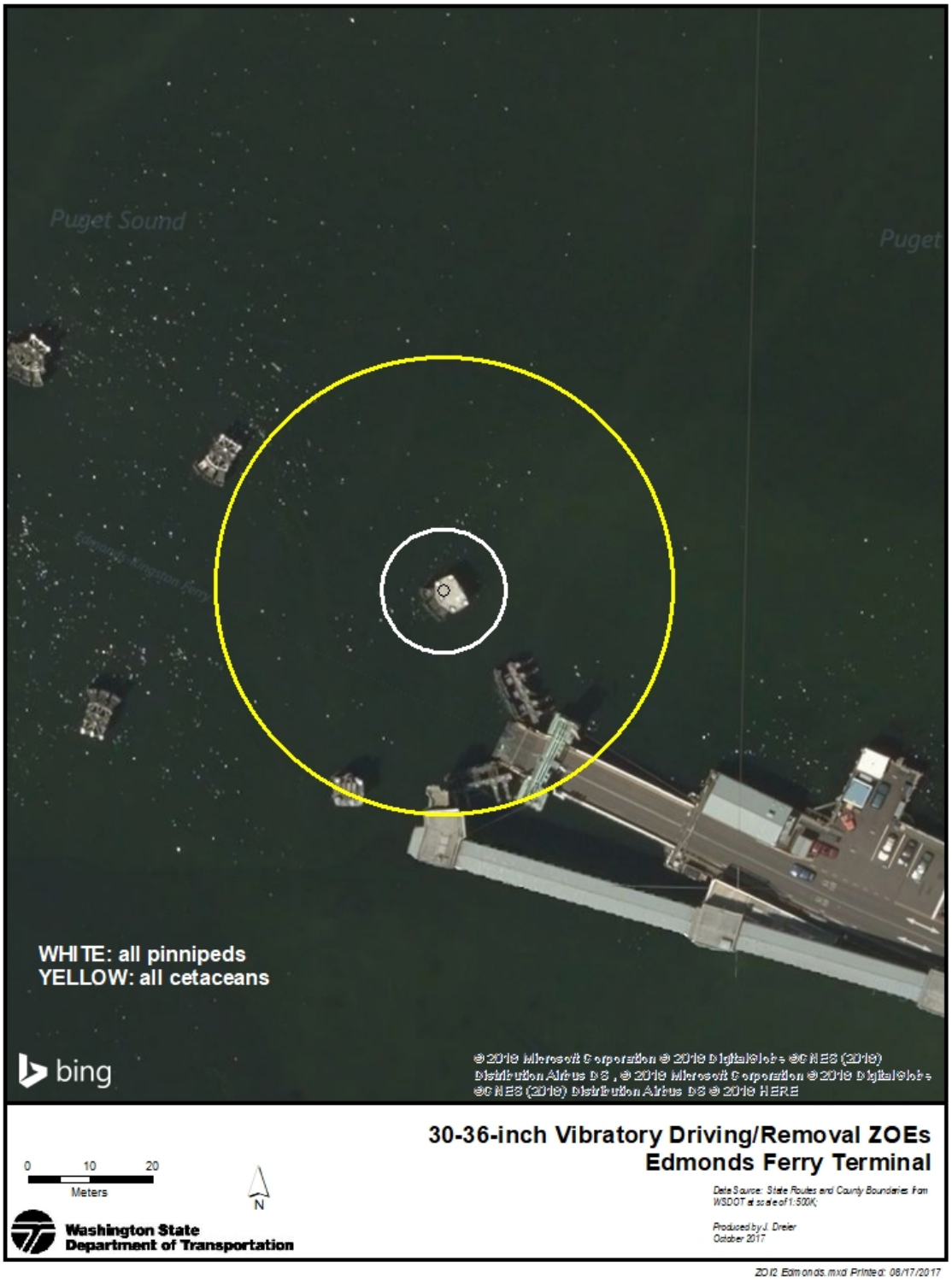


Figure 1-8. Edmonds ZOI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30-36-inch Vibratory Driving/Removal ZOEs
Edmonds Ferry Terminal
0 10 20
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Washington State Department of Transportation
Data Source: State Routes and County Boundaries from WSDOT at scale of 1:500K;
Produced by J. Dreier
October 2017
ZOI2 Edmonds.mxd Printed: 08/17/2017

1.6.4.7 ZOI Sound Source Verification (SSV) During Construction (Edmonds)

In-water noise measurements of vibratory pile driving and removal will be taken during the Edmonds project to determine if the ZOI needs to be modified. The Bremerton project is land-constrained, and measurements are unlikely to significantly change the modeled ZOI. If the Edmonds ZOI is modified, the marine mammal monitoring plan will be adjusted to ensure that harassment take is adequately monitored. If the Edmonds SSV verifies that the actual vs. modeled ZOI is 15 km or less, then the Marrowstone Island and the Mukilteo Ferry positions will be eliminated (see Appendix B Marine Mammal Monitoring Plan).

1.6.4.8 Vibratory Pile Driving Airborne Noise

NMFS has established an in-air noise disturbance threshold of 90 dB_{RMS} (unweighted) for harbor seals, and 100 dB_{RMS} (unweighted) for all other pinnipeds (sea lions).

The project includes vibratory driving of 30- and 36-inch diameter steel piles. The project also includes vibratory removal of 36-inch steel piles.

Noise generated during vibratory installation and/or removal of steel piles (96.9 dB at 50 feet) will reach the harbor seal threshold at approximately 34 m/111 ft., and is below the other pinnipeds threshold.

The nearest documented harbor seal haul out site to the Bremerton Ferry Terminal is 5.3 shoreline miles northwest within Dyes Inlet. The level of use of this haul out during the fall and winter is unknown, but is expected to be less as use of other haul outs have been shown to decrease in winter (Farrer and Acevedo-Gutierrez 2010). Harbor seals are known to haul out on docks and beaches throughout the project area.

The nearest documented California sea lion haul out site to the Bremerton Ferry Terminal is 5.4 shoreline miles east on a buoy within Rich Passage. The estimated number of California sea lions using the haul out is less than 10 (Jeffries, et al. 2000).

The nearest documented harbor seal and California sea lion haul out to the Edmonds Ferry Terminal is located on rafts and floats located 640 feet northeast of the dolphin relocation site. The estimated number of pinnipeds using this haul out is less than 100 animals (Jeffries, et al. 2000).

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2.0 Dates, Duration, and Region of Activity

The date(s) and duration of such activity and the specific geographical region where it will occur.

2.1 Dates

In-water construction at the Bremerton Ferry Terminal will commence after October 1, and is planned during the August 1, 2018 to February 15, 2019 in-water work window for Tidal Reference Area 5. In-water construction at the Edmonds Ferry Terminal will commence October 1, and is planned during the July 15, 2018 to February 15, 2019 in-water work window for Tidal Reference Area 6 (WAC 220-660-330).

2.2 Duration

The time it will take to complete pile driving depends on the difficulty in penetrating the substrate during pile installation. It is assumed that only one vibratory hammer will be in operation at a time. Durations are conservative, and the actual amount of time to install and remove piles will likely be less. Duration estimates of each of the pile driving/removal elements follow:

- Vibratory driving of each temporary 36-inch diameter steel indicator pile will take approximately 20 minutes, with one pile installed per day over two days.
- Vibratory removal of each temporary 36-inch diameter steel indicator pile will take approximately 15, with one pile removed per day over two days.
- Vibratory removal of each of the nine 36-inch diameter steel piles will take approximately 15 minutes, with up to three piles removed per day over three days.
- Vibratory driving of each of the seven 36-inch diameter steel piles will take approximately 20 minutes, with up to three piles installed per day over three days.
- Vibratory driving of each of the ten 30-inch diameter steel piles will take approximately 20 minutes, with up to three piles installed over four days.

The maximum anticipated number of days for vibratory pile driving is nine, with an estimated five days for pile removal.

2.3 Region of Activity

The Bremerton Ferry Terminal is located in the city of Bremerton, east of the Navy shipyard. Bremerton is on the shoreline of Sinclair Inlet, south of Bainbridge Island. Located in Kitsap County, Washington, the terminal is located in Section 24, Township 24 North, Range 1 East. The Edmonds Ferry Terminal is located in the city of Edmonds, along the downtown waterfront. Edmonds is in Snohomish County, approximately 15 miles north of Seattle. The terminal is located in Section 23, Township 27 North, Range 3 East (Figure 1-2).

3.0 Species and Numbers of Marine Mammals in Area

This section is a combination of items 3 and 4 from NOAA's list of information required for an incidental take authorization. It provides:

> *The species and numbers of marine mammals likely to be found within the activity area.*
>
> *A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.*

It also describes the ESA and MMPA status for each species. Possible ESA status designations include:

- Threatened: "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."
- Endangered: "any species which is in danger of extinction throughout all or a significant portion of its range."
- Proposed: *candidate species* that were found to warrant listing as either threatened or endangered and are officially proposed as such in a *Federal Register* notice.
- Delisted: No longer listed under the ESA.
- Unlisted: Not currently listed under the ESA.

Possible MMPA status designations include:

- Strategic: a marine mammal stock for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA.
- Depleted: the Secretary, after consultation with the Marine Mammal Commission and the Committee of Scientific Advisors on Marine Mammals established under MMPA title II, determines that a species or population stock is below its optimum sustainable population; a State, to which authority for the conservation and management of a species or population stock is transferred under section 109, determines that such species or stock is below its optimum sustainable population; or a species or population stock is listed as a threatened or endangered species under the ESA.
- Non-depleted: a species or population stock is at or above its optimum sustainable population (NMFS 2013a).

3.1 Species Present

Eleven species of marine mammals may be found in the Bremerton and Edmonds ferry terminal areas (Table 3-1).

Table 3-1. Marine Mammal Species Potentially Present in Region of Activity

Species	ESA Status	MMPA Status	Timing of Occurrence	Frequency of Occurrence
Harbor Seal	Not listed	Non-depleted	Year-round	Common
Northern Elephant Seal	No listed	Non-depleted	Year-round	Rare
California Sea Lion	Not listed	Non-depleted	August-April	Common
Steller Sea Lion	Delisted	Strategic/Depleted	August-April	Common
Killer Whale (Southern Resident)	Endangered	Depleted	September - May	Infrequent
Killer Whale (Transient)	Not listed	Depleted	Year-round	Infrequent
Gray Whale	Delisted	Unclassified	January-May	Occasional
Humpback Whale	Endangered	Depleted	September-May	Occasional
Minke Whale	Not listed	Non-depleted	September-January	Occasional
Harbor Porpoise	Not listed	Non-depleted	May-June peak	Occasional
Dall's Porpoise	Not listed	Non-depleted	October-February	Occasional
Long-beaked common dolphin	Not listed	Non-depleted	March-September	Rare

3.2 The Whale Museum Marine Mammal Sightings Data

The Whale Museum (TWM), located in Friday Harbor, San Juan Island, has the most extensive marine mammal sighting database for the Salish Sea (Georgia Basin/Strait of San Juan de Fuca/Puget Sound). WSF requested that TWM analyze sightings data for both the Bremerton and Edmonds ferry terminal project areas for the years 2010 to 2016, in the August to February timeframe scheduled for this project.

In the analysis of sightings data, multiple reports of marine mammals in the same region on the same day may possibly be the same individuals; therefore 'whale days' is used for southern resident killer whale (SRKW) sightings, and 'sighting days' is used for other marine mammals, rather than the number of sightings. A whale/sighting day is any day an SRKW/marine mammal is reported in a given area, regardless of the number of times they were reported that day.

Sightings data are assigned to a geographic quadrant, which are grid cells roughly 4.6 kilometers by 4.6 kilometers that were developed for reporting SRKW sightings before GPS units were readily available. Figure 3-1 shows the quadrants in the Bremerton Ferry Terminal area, including the quadrants of interest for the project. Figure 3-2 shows the quadrants in the Edmonds Ferry Terminal area, including the quadrants of interest for the project.

Figure 3-1 Bremerton ZOI and Area Quads

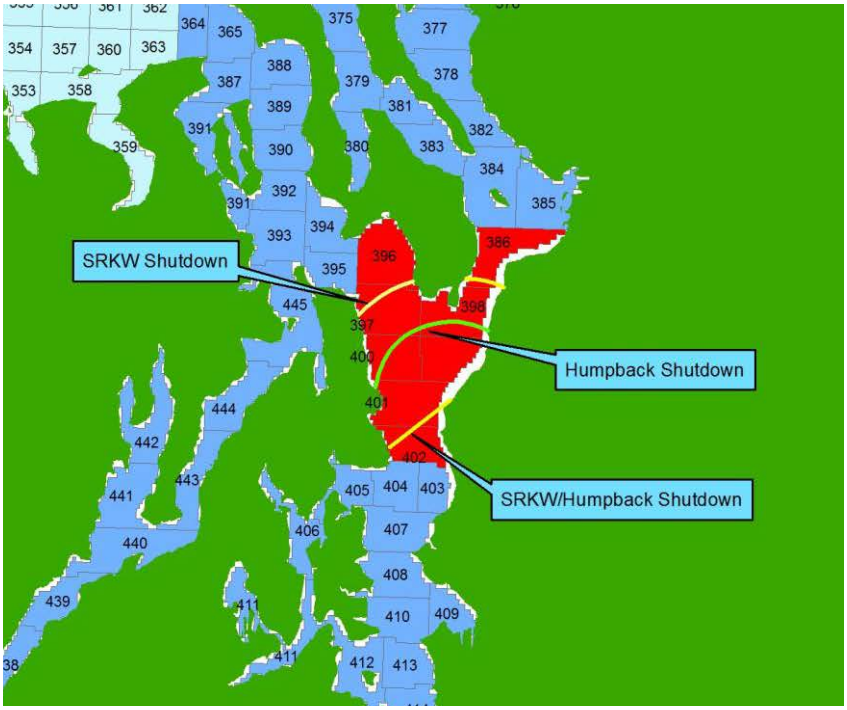

Figure 3-2 Edmonds ZOI and Area Quads

As sightings are opportunistic and SRKW can travel large distances in a day (~100 miles), it is important to analyze this data set across a region, rather than just single quadrants.

The primary area of interest in the analysis is the ZOI quadrant; however, since the project will be conducted in 'Area 2: Puget Sound' of the designated SRKW critical habitat, it is appropriate to include analyses at that geographic scale. Since there is a good chance that whales will be missed within a specific quadrant, a larger area is analyzed as well for comparison to the single quadrant.

Because other marine mammals (to a lesser degree than whales), can also travel across multiple quadrants, a conservative analysis approach was also taken. Marine mammal sightings days reported will also be for the Bremerton and Edmonds ZOI quadrants and adjacent quadrants.

It should be noted that data for marine mammals other than SRKW, gray, humpback, and transient killer whales (such as pinnipeds, porpoise and Minke) are collected in an opportunistic fashion. Pinnipeds and porpoise are probably present in the ZOI close to 365 days per year. The sightings data should be considered an absolute minimum number of sightings for those species in the area (TWM 2017a; 2017b).

3.3 Pinnipeds

There are four species of pinnipeds that may be found in the Bremerton and Edmonds ferry terminal areas: harbor seal (*Phoca vitulina richardsi*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*) and Steller sea lion (*Eumetopias jubatus*).

3.3.1 Harbor Seal

There are three stocks in Washington's inland waters, the Hood Canal, Northern Inland Waters, and Southern Puget Sound stocks. Seals belonging to the Northern Inland Waters Stock are present at the project sites. Pupping seasons vary by geographic region. For the northern Puget Sound region, pups are born from late June through August (WDFW 2012). After October 1 all pups in the inland waters of Washington are weaned. Of the pinniped species that commonly occur within the region of activity, harbor seals are the most common and the only pinniped that breeds and remains in the inland marine waters of Washington year-round (Calambokidis and Baird 1994).

3.3.1.1 Numbers

In 1999, Jeffries et al. (2003) recorded a mean count of 9,550 harbor seals in Washington's inland marine waters, and estimated the total population to be approximately 14,612 animals (including the Strait of Juan de Fuca). According to the 2014 Stock Assessment Report, the most recent estimate for the Washington Northern Inland Waters Stock is 11,036 (NMFS 2014a). No minimum population estimate is available. However, there are an estimated 32,000 harbor seals in Washington today, and their population appears to have stabilized (Jeffries 2013), so the estimate of 11,036 may be low.

3.3.1.2 Status

The Washington Inland Waters stock of harbor seals is "non-depleted" under the MMPA and "unlisted" under the ESA.

3.3.1.3 Distribution

Harbor seals are the most numerous marine mammal species in Puget Sound. Harbor seals are non-migratory; their local movements are associated with such factors as tides, weather, season, food availability and reproduction (Scheffer and Slipp 1944; Fisher 1952; Bigg 1969, 1981). They are not known to make extensive pelagic migrations, although some long-distance movements of tagged animals in Alaska (108 miles) and along the U.S. west coast (up to 342 miles) have been recorded (Pitcher and McAllister 1981; Brown and Mate 1983; Herder 1983).

Harbor seals haul out on rocks, reefs and beaches, and feed in marine, estuarine and occasionally fresh waters. Harbor seals display strong fidelity for haul out sites (Pitcher and Calkins 1979; Pitcher and McAllister 1981).

The nearest documented harbor seal haul out site to the Bremerton Ferry Terminal is 5.3 shoreline miles northwest within Dyes Inlet (Figure 3-3). The level of use of this haul out during the fall and winter is unknown, but is expected to be less as use of other haul outs have been shown to decrease in winter (Farrer and Acevedo-Gutierrez 2010). Harbor seals are known to haul out on docks and beaches throughout the project area.

The nearest documented harbor seal haul out to the Edmonds Ferry Terminal is located on rafts and floats located 640 feet northeast of the dolphin relocation site (Figure 3-4). The estimated number of pinnipeds using this haul out is less than 100 animals (Jeffries, et al. 2000).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report

In the timeframe scheduled for this project, the report estimates the density of harbor seal in the Bremerton Ferry Terminal area as a range between 0.550001 and 1.219000 animals/km2 (U.S. Navy 2015).

WSF Projects

In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, there were eight harbor seal sightings near the terminal (WSF 2015).

The Whale Museum

For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017a) reported no sightings days for harbor seals in the red and orange areas shown in Figure 3-1. It should be noted that pinnipeds are not reported at the same rate as large cetaceans, and harbor seals are likely present throughout the year in Puget Sound.

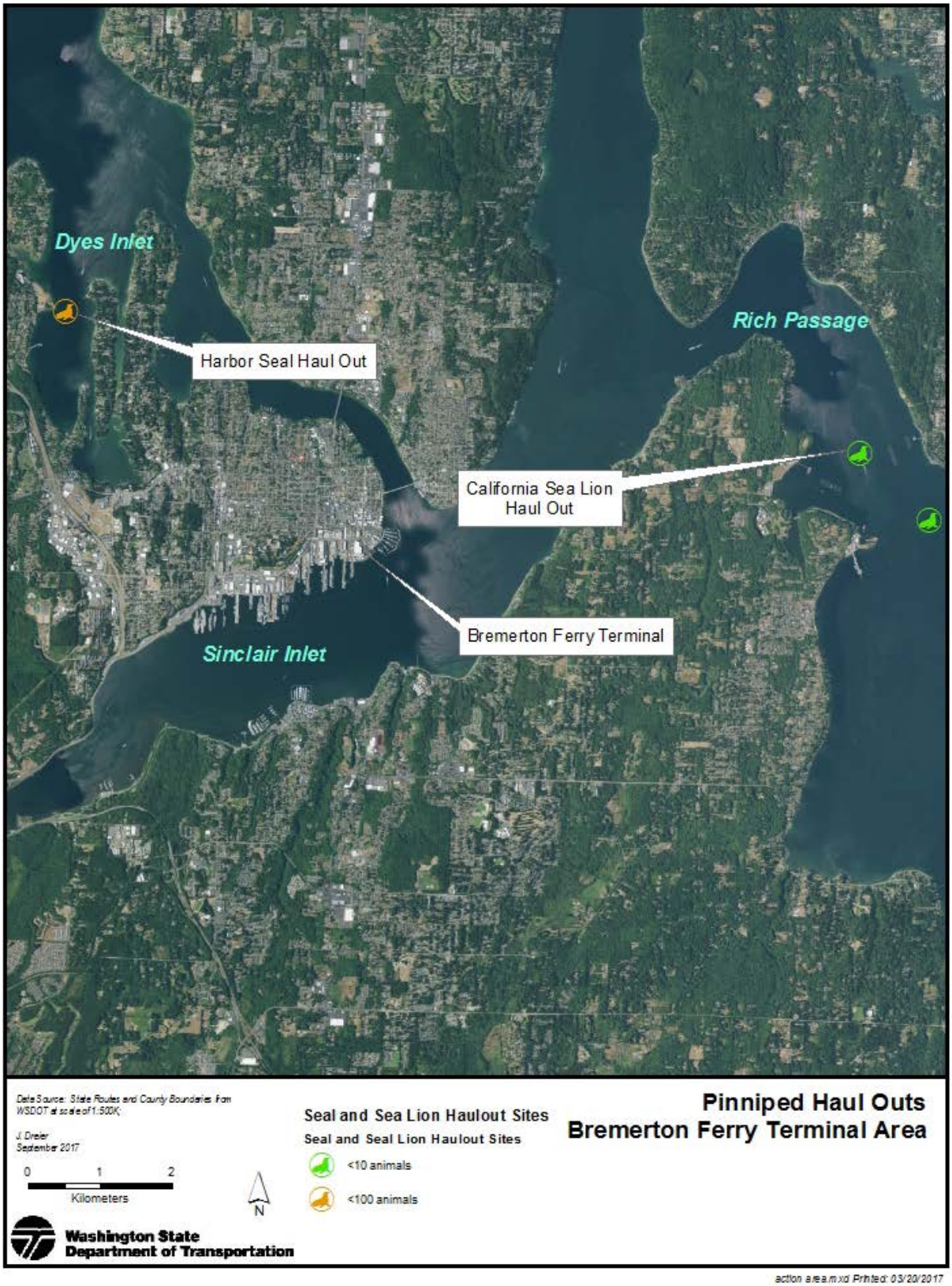

Figure 3-3. Pinniped haul outs in the Bremerton Ferry Terminal area.

Figure 3-4. Pinniped haul outs in the Edmonds Ferry Terminal area

NMFS Stranding Data

From the years 2010-2014, in the timeframe scheduled for this project, there were 126 confirmed harbor seal strandings in Kitsap County (Figure 3-5) (NMFS 2016b). Strandings were highest in late summer, which corresponds with the expected mortality rate (12 to 26 percent) of seal pups (Steiger et.al. 1989), though some adults were also included in the strandings.

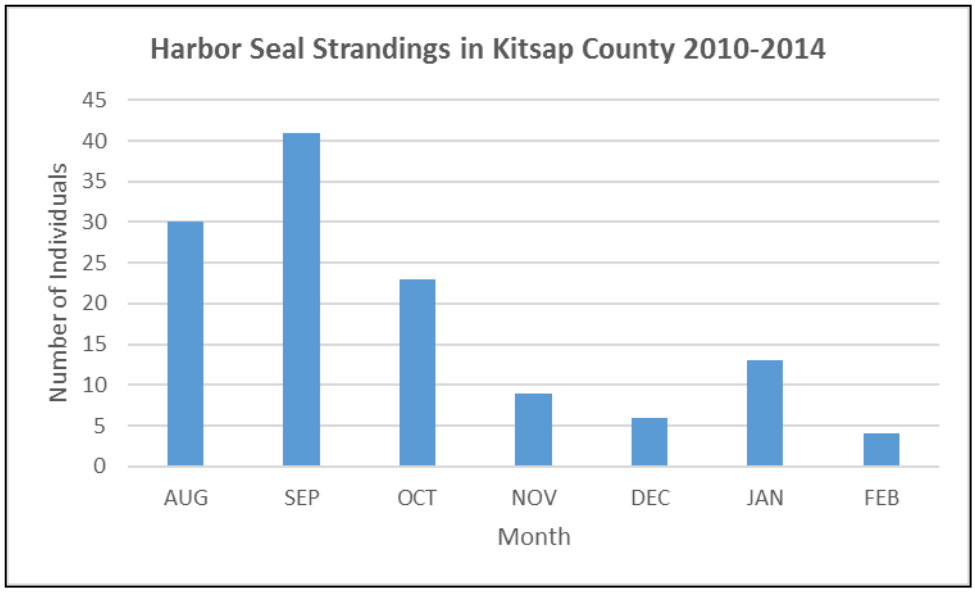

Figure 3-5. Confirmed harbor seal strandings in Kitsap County during the August to February work window.

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report

In the timeframe scheduled for this project, the report estimates the density of harbor seal in the Edmonds Ferry Terminal area as a range between 0.550001 and 1.219000 animals/km2 (U.S. Navy 2015).

WSF Projects

In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, there was one harbor seal sighting near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, there was one harbor seal sighting near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum

For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017b) reported four sightings days for harbor seals in the red quadrants shown

in Figure 3-2. It should be noted that pinnipeds are not reported at the same rate as large cetaceans, and harbor seals are likely present throughout the year in Puget Sound.

NMFS Stranding Data

From the years 2006-2015, in the timeframe scheduled for this project, there were 552 confirmed harbor seal strandings in the area that roughly corresponds to the upcoming project ZOIs in the Edmonds Ferry Terminal portion of the project (Figure 3-6) (NMFS 2016b). Strandings were highest in late summer, which corresponds with the expected mortality rate (12 to 26 percent) of seal pups (Steiger et.al. 1989), though some adults were also included in the strandings.

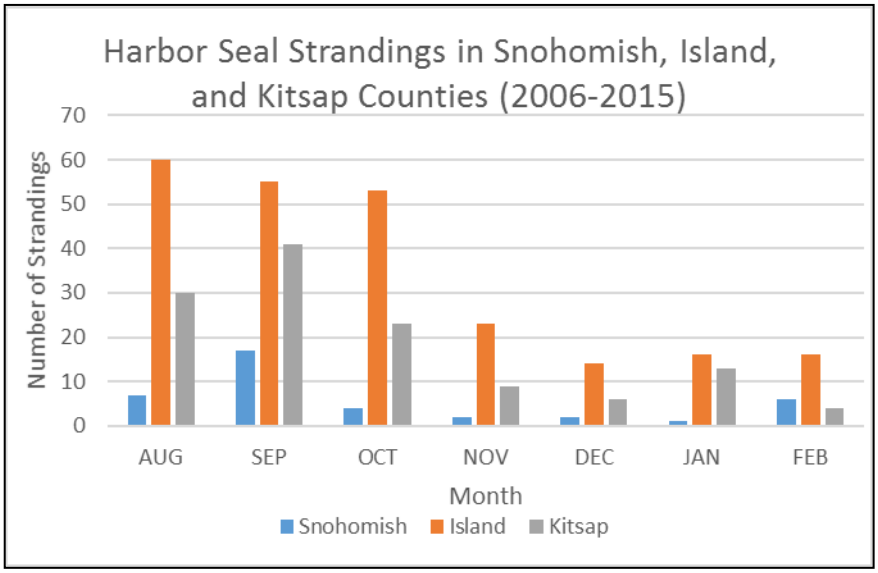

Figure 3-6. Confirmed harbor seal strandings in Snohomish, Island, and Kitsap counties during the August to February work window.

3.3.2 Northern Elephant Seal

The California breeding stock of northern elephant seal (*Mirounga angustirostris*) may be present near the project site.

3.3.2.1 Numbers

The California stock of northern elephant seal minimum population size is estimated very conservatively as 81,368 (NMFS 2015e). In Puget Sound and the Strait of San Juan de Fuca, 10 to 15 northern elephant seal pups are born each year on Whidbey, Protection, and Smith Islands, Dungeness Spit and Race Rocks. Using a multiplier of 4.4 (NMFS 2015e) with the maximum pup count of 15, the Salish Sea population could be as large as 66 individuals.

3.3.2.2 Distribution

Northern elephant seals breed and give birth in California (U.S.) and Baja California (Mexico), primarily on offshore islands, from December to March. Males feed near the eastern Aleutian Islands and in the Gulf of Alaska, and females feed further south, south of 45o north latitude. Adults return to land between March and August to molt, with males returning later than

females. Adults return to their feeding areas again between their spring/summer molting and their winter breeding seasons (NMFS 2015e).

The closest documented northern elephant seal haulouts are at Protection Island (approximately 38 miles northwest of the Edmonds Ferry Terminal, and approximately 60 miles north of the Bremerton Ferry Terminal).

Elephant seals also use area beaches as haulouts, such as a female elephant seal who has been coming to a south Whidbey beach to rest while molting each spring for several years, and recently gave birth to a pup. Male elephant seals have also been observed in Puget Sound, as far south as Vashon Island (Miller 2015 personal comm. 4/6/15).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of northern elephant seals in the Bremerton Ferry Terminal area as 0.00001 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no northern elephant seals were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017) reported no sightings days for northern elephant seals in the red and orange quadrants shown in Figure 3-1. It should be noted that pinnipeds are not reported at the same rate as large cetaceans.

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no confirmed northern elephant seal strandings in Kitsap County (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of northern elephant seals in the Edmonds Ferry Terminal area as 0.00001 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no northern elephant seals were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds

Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no northern elephant seals were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017b) reported one sightings day (in September) for northern elephant seals in the red quadrants shown in Figure 3-2. It should be noted that pinnipeds are not reported at the same rate as large cetaceans.

NMFS Stranding Data
From the years 2006-2015, in the August to February timeframe scheduled for this project, there was one confirmed northern elephant seal stranding in Island County (NMFS 2016b).

3.3.3 California Sea Lion

Washington California sea lions are part of the U.S. stock, which begins at the U.S./Mexico border and extends northward into Canada.

3.3.3.1 Numbers

The minimum population size of the U.S. stock was estimated at 296,750 in 2011. More recent pup counts made in 2011 totaled 61,943, the highest recorded to date. Estimates of total population size based on these counts are currently being developed (NMFS 2015c). Some 3,000 to 5,000 animals are estimated to move into northwest waters (both Washington and British Columbia) during the fall (September) and remain until the late spring (May) when most return to breeding rookeries in California and Mexico (Jeffries et al. 2000; J. Calambokidis pers. comm. 2008). Peak counts of over 1,000 animals have been made in Puget Sound (Jeffries et al. 2000).

3.3.3.2 Status

California sea lions are not listed as endangered or threatened under the ESA or as depleted under the MMPA. They are not considered a strategic stock under the MMPA, because total human-caused mortality, although unknown, is likely to be well less than the PBR (9,200) (NMFS 2015c).

3.3.3.3 Distribution

California sea lions breed on islands off Baja Mexico and southern California with primarily males migrating north to feed in the northern waters (Everitt et al. 1980). Females remain in the waters near their breeding rookeries off California and Mexico. All age classes of males are seasonally present in Washington waters (Jeffries, et al. 2000).

California sea lions were unknown in Puget Sound until approximately 1979 (Steiger and Calambokidis 1986). Everitt et al. (1980) reported the initial occurrence of large numbers at Port Gardner, Everett (northern Puget Sound) in the spring of 1979. The number of California sea lions using the Everett haul out numbered around 1,000. This haul out remains the largest in the

state for sea lions in general and for California sea lions specifically (P. Gearin pers. comm. 2008). Similar sightings and increases in numbers were documented throughout the region after the initial sighting in 1979 (Steiger and Calambokidis 1986), including urbanized areas such as Elliott Bay near Seattle and heavily used areas of central Puget Sound (P. Gearin et al. 1986). In Washington, California sea lions use haul out sites within all inland water regions (Jeffries, et al. 2000). The movement of California sea lions into Puget Sound could be an expansion in range of a growing population (Steiger and Calambokidis 1986).

California sea lions do not avoid areas with heavy or frequent human activity, but rather may approach certain areas to investigate. This species typically does not flush from a buoy or haul out if approached.

The nearest documented California sea lion haul out site to the Bremerton Ferry Terminal is 1.4 shoreline miles east on buoys located in Rich Pasage (Figure 3-3). The estimated number of California sea lions using the haul out is less than 10 (Jeffries, et al. 2000).

The nearest documented California sea lion haul out to the Edmonds Ferry Terminal is located on rafts and floats located 625 feet northeast of the dolphin relocation site (Figure 3-4). The estimated number of pinnipeds using this haul out is less than 100 animals (Jeffries, et al. 2000).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of California sea lion in the Bremerton Ferry Terminal area as a range between 0.067601 and 0.12660 animals/ km2 (U.S. Navy 2015).

U.S. Navy Rich Passage Counts
From November of 2012 to February of 2014, the U.S. Navy collected sightings data of California sea lions hauled-out on the Rich Passage net pens (Figure 3-7). In the September to February timeframe scheduled for this project, the Navy reported a total of 566 California sea lions over 14 days of observation, with a high of 110 on January 14, 2014 (U.S. Navy 2014b).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, there were 15 California sea lion sightings near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017a) reported no sightings days for California sea lions in the red and orange areas shown in Figure 3-1. It should be noted that pinnipeds are not reported at the same rate as large cetaceans.

Figure 3-7. Sea lions on the Rich Passage Net Pens (U.S. Navy 2012).

NMFS Stranding Data

From the years 2006-2015, in the timeframe scheduled for this project, there were 18 California sea lion strandings in Kitsap County (Figure 3-8) (NMFS 2016b).

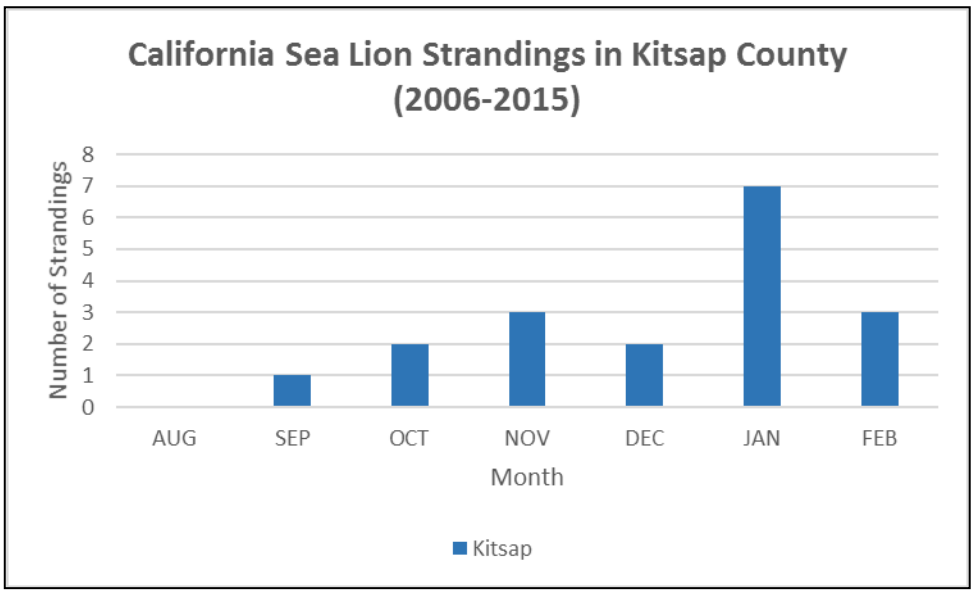

Figure 3-8. Confirmed California sea lion strandings in Kitsap County during the August to February work window.

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of California sea lion in the Edmonds Ferry Terminal area as a range between 0.067601 and 0.12660 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no California sea lions were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no California sea lions were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017b) reported one sightings day for California sea lions in the red and orange areas shown in Figure 3-2. It should be noted that pinnipeds are not reported at the same rate as large cetaceans.

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were 34 confirmed harbor seal strandings in the area that roughly corresponds to the upcoming project ZOIs in the Edmonds Ferry Terminal portion of the project (Figure 3-9) (NMFS 2016b).

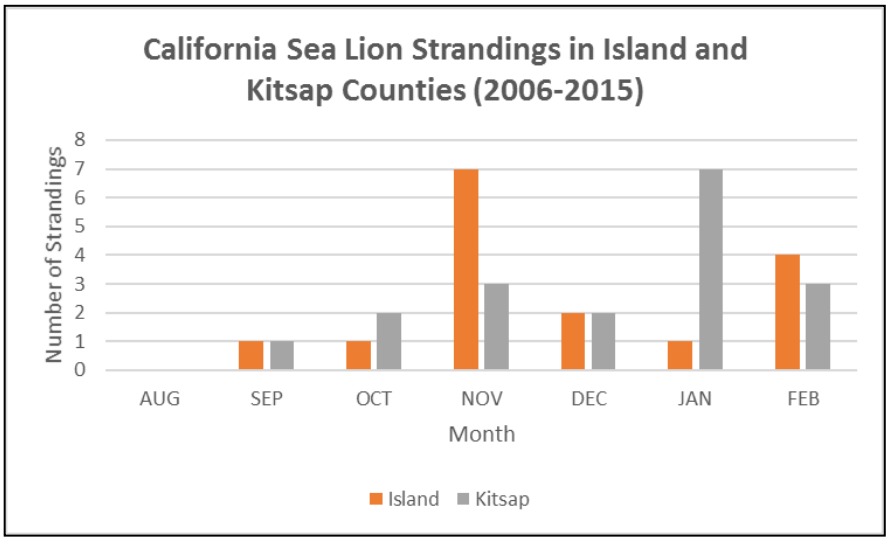

Figure 3-9. Confirmed California sea lion strandings in Island, and Kitsap counties during the August to February work window.

3.3.4 Steller Sea Lion

The Eastern U.S. stock of Steller sea lion may be present near the project site.

3.3.4.1 Numbers

The eastern U.S. stock of Steller sea lions is estimated to be within the range of 60,131 and 74,448 based on pup counts, and a Washington minimum population estimate of 1,749 (NMFS 2014b). In Washington waters, Steller sea lion abundances vary seasonally with a minimum estimate of 1,000 to 2,000 individuals present or passing through the Strait of Juan de Fuca in fall and winter months (S. Jeffries pers. comm. 2008).

Steller sea lion numbers in Washington State decline during the summer months, which correspond to the breeding season at Oregon and British Columbia rookeries (approximately late May to early June) and peak during the fall and winter months (Jeffries, et al. 2000). A few Steller sea lions can be observed year-round in Puget Sound although most of the breeding age animals return to rookeries in the spring and summer (P. Gearin pers. comm. 2008).

3.3.4.2 Status

The eastern stock of Steller sea lions are "depleted/strategic" under the MMPA and were "delisted" under the ESA on November 4, 2013 (78 FR 66140).

3.3.4.3 Distribution

Adult Steller sea lions congregate at rookeries in Oregon, California, and British Columbia for pupping and breeding from late May to early July. Small numbers have begusn to breed and pup in Washington as recovery of the species has continued (Wiles 2015). Rookeries are usually located on beaches of relatively remote islands, often in areas exposed to wind and waves, where access by humans and other mammalian predators is difficult (WDFW 1993).

Overall abundance within Washington is greatest along the outer coast, with fewer individuals found in inland waters east of Cape Flattery. Numbers in the inner marine waters have not been quantified in recent years, but as many as 100 animals have been counted during the winter at the mouth of the Nisqually River (Wiles 2015). For Washington inland waters, Steller sea lion abundances vary seasonally with a minimum estimate of 1,000 to 2,000 individuals present or passing through the Strait of Juan de Fuca in fall and winter months (S. Jeffries pers. comm. 2008). The number of haul out sites has increased in recent years.

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of Steller sea lion in the Bremerton Ferry Terminal area as a range between 0.025101 and 0.036800 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no Steller sea lions were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017a) reported no sightings days for Steller sea lion in the red and orange areas shown in Figure 3-1. It should be noted that pinnipeds are not reported at the same rate as large cetaceans.

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were four confirmed Steller sea lion strandings in Kitsap County: two each in the months of November and February (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of Steller sea lion in the Edmonds Ferry Terminal area as a range between 0.025101 and 0.036800 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no Steller sea lions were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no Steller sea lions were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum (2017b) reported no sightings days for Steller sea lion in the red quadrants shown in Figure 3-2. It should be noted that pinnipeds are not reported at the same rate as large cetaceans.

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were two confirmed Steller sea lion strandings in Island County: one each in the months of November and January (NMFS 2016b).

3.4 Cetaceans

Seven cetacean species may be present in the Bremerton and Edmonds ferry terminal areas: killer whale (southern resident and transient), gray whale, humpback whale, minke whale, harbor porpoise, Dall's porpoise, and long-beaked common dolphin.

3.4.1 Killer Whale

The Eastern North Pacific Southern Resident (SRKW) and West Coast Transient (Transient) stocks of killer whale may be found near the project site. Killer whales are mid-frequency hearing range cetaceans (Southall et al. 2007).

3.4.1.1 Numbers

Southern Resident Stock

The Southern Residents live in three family groups known as the J, K and L pods. As of August 2017, the stock collectively numbered 77 individuals (J Pod=24, K Pod=19, L Pod=35) (Orca Network 2017).

On February 10, 2015, NOAA Fisheries announced a final rule that includes Lolita, a captive killer whale at the Miami Seaquarium, in the endangered species listing for the Southern Resident killer whale population. While technically this raises the total stock to 78, 77 will be used as Lolita is still captive.

West Coast Transient Stock

Transient killer whales generally occur in smaller (less than 10 individuals), less structured pods, though pods as large as 12 have been occasionally observed in Puget Sound (NMFS 2013c). According to the Center for Whale Research (CWR 2015), they tend to travel in small groups of one to five individuals, staying close to shorelines, often near seal rookeries when pups are being weaned. The West Coast Transient stock, which includes individuals from California to southeastern Alaska, is has a minimum population estimate of 243 (NMFS 2013b). Transient sightings have become more common since the mid-2000s. Unlike the SRKW pods, Transients may be present in the area for hours as they hunt pinnipeds.

3.4.1.2 Status

Southern Resident Stock

The SRKW stock was declared "depleted/strategic" under the MMPA in May 2003 (68 FR 31980). On November 18, 2005, the SR stock was listed as "endangered" under the ESA (70 FR 69903). On November 29, 2006, NMFS published a final rule designating critical habitat for the SR killer whale DPS. Both Puget Sound and the San Juan Islands are designated as core areas of critical habitat under the ESA, excluding areas less than 20 feet deep relative to extreme high water (71 FR 69054). A final recovery plan for Southern Residents was published in January of 2008 (NMFS 2008a). On February 23, 2015, NOAA Fisheries announced a 12-month finding on a petition to revise the Critical Habitat Designation for the Southern Resident killer whale distinct population segment as warranted (NMFS 2015a).

West Coast Transient Stock

The West Coast Transient stock is "non-depleted" under the MMPA, and "unlisted" under the ESA (NMFS 2013b).

Washington State Status

In Washington State, all killer whales that may be present in Washington waters (Southern Resident, West Coast Transient, and Offshore) were listed as a state candidate species in 2000. In April 2004, the State upgraded their status to a "state endangered species" (Wiles 2004).

3.4.1.3 Distribution

The SRKW and West Coast Transient stocks are both found within Washington inland waters. Individuals of both stocks have long-ranging movements and regularly leave the inland waters (Calambokidis and Baird 1994).

Southern Resident Stock Distribution

Southern Residents are documented in coastal waters ranging from central California to the Queen Charlotte Islands, British Columbia (NMFS 2008a). They occur in all inland marine waters. SR killer whales generally spend more time in deeper water and only occasionally enter water less than 15 feet deep (Baird 2000). Distribution is strongly associated with areas of greatest salmon abundance, with heaviest foraging activity occurring over deep open water and in areas characterized by high-relief underwater topography, such as subsurface canyons, seamounts, ridges, and steep slopes (Wiles 2004).

Fall/Winter Distribution. In fall, all three pods occur in areas where migrating salmon are concentrated such as the mouth of the Fraser River. They may also enter areas in Puget Sound where migrating chum and Chinook salmon are concentrated (Osborne 1999). In the winter months, the K and L pods spend progressively less time in inland marine waters and depart for coastal waters in January or February. The pods spend over 50 percent of the winter months on the outer coast (NMFS 2014c). The J pod is most likely to appear year-round near the San Juan Islands, and in the fall/winter, in the lower Puget Sound and in Georgia Strait at the mouth of the Fraser River.

Bremerton Ferry Terminal Southern Resident Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of SRKW whales in the Bremerton Ferry Terminal area as a range between 0.00 and 0.000482 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no southern resident killer whales were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The

Whale Museum reported one whale day (in January) for SRKW in the red and orange areas shown in Figure 3-1 (TWM 2017a).

NMFS Stranding Data

According to the NMFS National Stranding Database, there were no killer whale strandings in the Bremerton Ferry Terminal area between 2006 and 2015 (NMFS 2016b).

Edmonds Ferry Terminal Southern Resident Density and Sightings

U.S. Navy Density Report

In the fall and winter timeframe scheduled for this project, the report estimates the density of SRKW whales in the Edmonds Ferry Terminal area as a range between 0.000483 and 0.004760 animal/ km2 (U.S. Navy 2015).

WSF Projects

In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no southern resident killer whales were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no southern resident killer whales were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum

For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported 89 whale days for SRKW in the red quandrants shown in Figure 3-2 (TWM 2017b). October through December have the highest consistent use (Table 3-2).

Year	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2010	1	0	3	5	0	0	0
2011	0	0	0	1	2	0	3
2012	1	2	4	1	4	0	2
2013	0	2	3	3	1	3	0
2014	1	1	0	4	2	2	3
2015	5	1	2	3	1	0	2
2016	3	3	4	4	3	1	3
Totals	11	9	16	21	13	6	13
Average	1.6	1.3	2.3	3.0	1.9	0.9	1.9

Table 3-2. SRKW Whale Days by Year/Project Month

NMFS Stranding Data
According to the NMFS National Stranding Database, there were no killer whale strandings in the Edmonds Ferry Terminal area between 2006 and 2015 (NMFS 2016b).

West Coast Transient Stock Distribution

The West Coast Transient stock occurs in California, Oregon, Washington, British Columbia, and southeastern Alaskan waters. Within the inland waters, they may frequent areas near seal rookeries when pups are weaned (Baird and Dill 1995).

West Coast Transients are documented intermittently year-round in Washington inland waters.

Bremerton Ferry Terminal Transient Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of transient killer whales in the Bremerton Ferry Terminal area as a range between 0.000575 and 0.002373 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no transient killer whales were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported two sightings days for transients in the red and orange areas shown in Figure 3-1 (Table 3-3) (TWM 2017a).

Table 3-3. Bremerton Transient Killer Whale Sightings Days 2010-2016

Aug	Sept	Oct	Nov	Dec	Jan	Feb
0	0	0	0	1	1	0

NMFS Stranding Data
According to the NMFS National Stranding Database, there were no killer whale strandings in the Bremerton Ferry Terminal area between 2006 and 2015 (NMFS 2016b).

Edmonds Ferry Terminal Transient Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of transient killer whales in the Edmonds Ferry Terminal area as a range between 0.000575 and 0.002373 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no transient killer whales were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no transient killer whales were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported 31 sightings days for transient killer whales in the red quandrants shown in Figure 3-2 (Table 3-4) (TWM 2017b).

Table 3-4. Edmonds Transient Killer Whale Sightings Days, 2010-2016

Aug	Sept	Oct	Nov	Dec	Jan	Feb
12	4	1	0	4	6	4

NMFS Stranding Data
According to the NMFS National Stranding Database, there were no killer whale strandings in the Edmonds Ferry Terminal area between 2006 and 2015 (NMFS 2016b).

3.4.2 Gray Whale

The Eastern North Pacific gray whale may be found near the project site. Gray whales are low-frequency range cetaceans (Southall et al. 2007).

3.4.2.1 Numbers

The most recent population estimate for the Eastern North Pacific stock is 20,990 individuals (NMFS 2015d). Within Washington waters, gray whale sightings reported to Cascadia Research and the Whale Museum between 1990 and 1993 totaled over 1,100 (Calambokidis et al. 1994). Abundance estimates calculated for the small regional area between Oregon and southern Vancouver Island, including the San Juan Area and Puget Sound, suggest there were 137 to 153 individual gray whales from 2001 through 2003 (Calambokidis et al. 2004a). Forty-eight individual gray whales were observed in Puget Sound and Hood Canal in 2004 and 2005 (Calambokidis 2007).

3.4.2.2 Status

The Eastern North Pacific stock of gray whales is “non-depleted” under the MMPA, and was “delisted” under the ESA in 1994 after a 5-year review by NOAA Fisheries. In 2001 NOAA

Fisheries received a petition to relist the stock under the ESA, but it was determined that there was not sufficient information to warrant the petition (Angliss and Outlaw 2007).

3.4.2.3 Distribution

Although typically seen during their annual migrations on the outer coast, a regular group of gray whales annually comes into the inland waters at Saratoga Passage and Port Susan (south Whidbey Island area) from March through May to feed on ghost shrimp (Weitkamp et al. 1992; Calambokidis pers. comm. 2006). The size of the group is 10-12 individuals, and some are arriving as early as January and staying into July (Orca Network 2015). During this time frame they are also seen in the Strait of Juan de Fuca, the San Juan Islands, and areas of Puget Sound, although the observations in Puget Sound are highly variable between years (Calambokidis et al. 1994). The average tenure within Washington inland waters is 47 days and the longest stay was 112 days (Calambokidis 2007).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of gray whales in the Bremerton Ferry Terminal area as a range between 0.000002 and 0.000510 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no gray whales were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported one sightings day (in January) for gray whale in the red and orange areas shown in Figure 3-1 (TWM 2017a).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were two gray whale strandings in Kitsap County, one each in the months of December and January (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of gray whales in the Edmonds Ferry Terminal area as a range between 0.000002 and 0.000510 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no gray whales were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no gray whales were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum

For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported 17 sightings days for gray whale in the red quandrants shown in Figure 3-2 (Table 3-5) (TWM 2017b).

Table 3-5. Edmonds Gray Whale Sightings Days, 2010-2016

Aug	Sept	Oct	Nov	Dec	Jan	Feb
0	0	0	5	0	4	8

NMFS Stranding Data

From the years 2006-2015, in the timeframe scheduled for this project, there were three confirmed gray whale strandings in the area that roughly corresponds to the upcoming project ZOIs in the Edmonds Ferry Terminal portion of the project. These strandings occurred in the months of December and January (NMFS 2016b).

3.4.3 Humpback Whale

The California-Oregon-Washington (CA-OR-WA) stock of humpback whale may be found near the project site. Humpback whales are low-frequency hearing range cetaceans (Southall et al. 2007).

3.4.3.1 Numbers

The SAR abundance estimate is 1,918 individuals. The minimum population estimate is 1,918 (NMFS 2014d).

3.4.3.2 Status

The California-Oregon-Washington stock of humpback whales is “depleted/strategic” under the MMPA, and “endangered” under the Endangered Species Conservation Act of 1969. This protection was transferred to the ESA in 1973. A recovery plan was adopted in 1991(NMFS 1991).

3.4.3.3 Distribution

Historically, humpback whales were common in inland waters of Puget Sound and the San Juan Islands (Calambokidis et al. 2004b). In the early 1900s, there was a productive commercial hunt for humpbacks in Georgia Strait that was probably responsible for their long disappearance from local waters (Osborne et al. 1988). Commercial hunts ended in the 1960’s. Since the mid-1990s, sightings in Puget Sound have increased.

This stock calves and mates in coastal Central America and Mexico and migrates up the coast from California to southern British Columbia in the summer and fall to feed (NMFS 1991; Marine Mammal Commission 2003; Carretta et al. 2007a). Humpback whales are seen in Puget Sound, but more frequent sightings occur in the Strait of Juan de Fuca and near the San Juan Islands. Most sightings are in spring and summer.

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of humpback whales in the Bremerton Ferry Terminal area as ranging between 0.000010 and 0.00007 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no humpback whales were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for humpback whale in the red and orange areas shown in Figure 3-1 (TWM 2017a).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no humpback whale strandings in the Bremerton area that corresponds to the upcoming project ZOIs (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the fall and winter timeframe scheduled for this project, the report estimates the density of humpback whales in the Edmonds Ferry Terminal area as ranging between 0.000010 and 0.00007 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no humpback whales were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two

days of monitoring in July 2017, no humpback whales were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum

For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported 164 sightings days for humpback whale in the red quadrants shown in Figure 3-2 (Figure 3-10) (TWM 2017b).

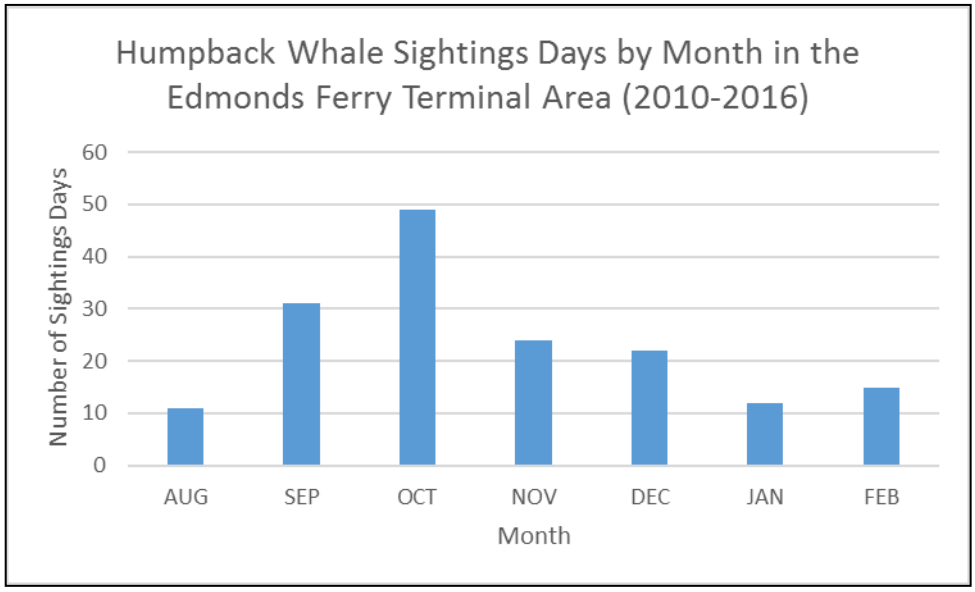

Figure 3-10. Humpback whale presence in the Edmonds Ferry Terminal Area

NMFS Stranding Data

From the years 2006-2015, in the timeframe scheduled for this project, there were no humpback whale strandings in the Edmonds area that corresponds to the upcoming project ZOIs (NMFS 2016b).

3.4.4 Minke Whale

The California-Oregon-Washington (CA-OR-WA) stock of Minke whale may be found near the project site. Minke whales are low-frequency hearing range cetaceans (Southall et. al. 2007).

The CA-WA-OR stock is considered a resident stock (NMFS 2016c), and includes minke whales within the inland Washington waters of Puget Sound and the San Juan Islands.

Minke whales have small dark sleek bodies and a small dorsal fin. These whales are often recognized by surfacing snout first and a shallow but visible “bushy” blow. Minke whales feed by side lunging into schools of prey and gulping in large amounts of water. Food sources typically consist of krill, copepods, and small schooling fish, such as anchovies, herring, mackerel, and sand lance (NMFS 2016c).

3.4.4.1 Numbers

Information on minke whale population and abundance is limited due to difficulty in detection. Conducting surveys for the minke whale is difficult because of their low profiles, indistinct blows, and tendency to occur as single individuals (Green et al. 1992). The minimum population estimate of Minke whales in the CA-OR-WA stock is 369 individuals (NMFS 2016c).

Over a 10-year period, 30 individuals were photo-identified in the U.S./Canada trans-boundary area around the San Juan Islands and demonstrated high site fidelity (Dorsey et al. 1990; Calambokidis and Baird 1994). In a single year, up to 19 individuals were photo-identified from around the San Juan Islands (Dorsey et al. 1990).

3.4.4.2 Status

Minke whales are not listed under the ESA and are classified as non-depleted under the MMPA.

3.4.4.3 Distribution

Minke whales are reported in Washington inland waters year-round, although few are reported in the winter (Calambokidis and Baird 1994). Minke whales are relatively common in the San Juan Islands and Strait of Juan de Fuca (especially around several of the banks in both the central and eastern Strait), but are relatively rare in Puget Sound.

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of minke whales in the Bremerton Ferry Terminal area as a range between 0.0000010 and 0.000030 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no minke whales were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for minke whale in the red and orange areas shown in Figure 3-1 (TWM 2017a).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no minke whale strandings in the Bremerton Ferry Terminal area that corresponds to the upcoming project ZOIs (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of minke whales in the Edmonds Ferry Terminal area as a range between 0.000801 and 0.002 animal/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no minke whales were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no minke whales were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported four sightings days for minke whale in the red quadrants shown in Figure 3-2 (Table 3-6) (TWM 2017b).

Table 3-6. Edmonds Minke Whale Sightings Days, 2010-2016

Aug	Sept	Oct	Nov	Dec	Jan	Feb
1	0	0	2	0	0	1

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no minke whale strandings in the Edmonds Ferry Terminal area that corresponds to the upcoming project ZOIs (NMFS 2016b).

3.4.5 Harbor Porpoise

The Washington Inland Waters Stock of harbor porpoise may be found near the Bremerton and Edmonds project sites. The Washington Inland Waters Stock occurs in waters east of Cape Flattery (Strait of Juan de Fuca, San Juan Island Region, and Puget Sound). Harbor porpoise are high-frequency hearing range cetaceans (Southall et. al. 2007).

3.4.5.1 Numbers
The Washington Inland Waters Stock mean abundance estimate based on 2013 to 2015 aerial surveys conducted in the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia is 11,233 harbor porpoises (NMFS 2017a). No minimum population estimate is available.

No harbor porpoise were observed within Puget Sound proper during comprehensive harbor porpoise surveys (Osmek et al. 1994) or Puget Sound Ambient Monitoring Program (PSAMP) surveys conducted in the 1990s (WDFW 2008). Declines were attributed to gill-net fishing, increased vessel activity, contaminants, and competition with Dall's porpoise.

However, populations appear to be rebounding with increased sightings in central Puget Sound (Carretta et al. 2007a) and southern Puget Sound (D. Nysewander pers. comm. 2008; WDFW 2008; WDFW/Cascadia 2016). Recent systematic boat surveys of the main basin indicate that at least several hundred and possibly as many as low thousands of harbor porpoise are now present. While the reasons for this recolonization are unclear, it is possible that changing conditions outside of Puget Sound, as evidenced by a tripling of the population in the adjacent waters of the Strait of Juan de Fuca and San Juan Islands since the early 1990s, and the recent higher number of harbor porpoise mortalities in coastal waters of Oregon and Washington, may have played a role in encouraging harbor porpoise to explore and shift into areas like Puget Sound (Hanson, et. al. 2011; WDFW/Cascadia 2016).

3.4.5.2 Status

The Washington Inland Waters Stock of harbor porpoise is "non-depleted" under MMPA, and "unlisted" under the ESA.

3.4.5.3 Distribution

Harbor porpoises are common in the Strait of Juan de Fuca and south into Admiralty Inlet, especially during the winter, and are becoming more common south of Admiralty Inlet.

Little information exists on harbor porpoise movements and stock structure near the Bremerton and Edmonds ferry terminal areas, although it is suspected that in some areas harbor porpoises migrate (based on seasonal shifts in distribution). For instance Hall (2004; pers. comm. 2008) found harbor porpoises off Canada's southern Vancouver Island to peak during late summer, while the WDFW's PSAMP data show peaks in Washington waters to occur during the winter.

Hall (2004) found that the frequency of sighting of harbor porpoises decreased with increasing depth beyond 150 m with the highest numbers observed at water depths ranging from 61 to 100 m. Although harbor porpoises have been spotted in deep water, they tend to remain in shallower shelf waters (<150 m) where they are most often observed in small groups of one to eight animals (Baird 2003).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report

In the timeframe scheduled for this project, the report estimates the density of harbor porpoise in the Bremerton Ferry Terminal area as a range between 0.061701 and 0.156000 animals/ km2 (U.S. Navy 2015).

WDFW Aerial Surveys

WDFW has carried out annual winter aerial marine bird surveys for Washington inner marine water every year from 1994 to the present (excluding 2007). In addition to marine birds, all

marine mammal observations have been recorded. The survey results were used to estimate the winter mean densities of harbor porpoise by basin. The density of harbor porpoise in the Bremerton Ferry Terminal area is estimated as a range between 0 and 0.58 (WDFW/Cascadia 2016).

WSF Projects

In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no harbor porpoise were observed near the terminal (WSF 2015).

The Whale Museum

For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for harbor porpoise in the red and orange areas shown in Figure 3-1 (TWM 2017a).

NMFS Stranding Data

From the years 2006-2015, in the timeframe scheduled for this project, there were 26 harbor porpoise strandings in Kitsap County (Figure 3-11) (NMFS 2016b).

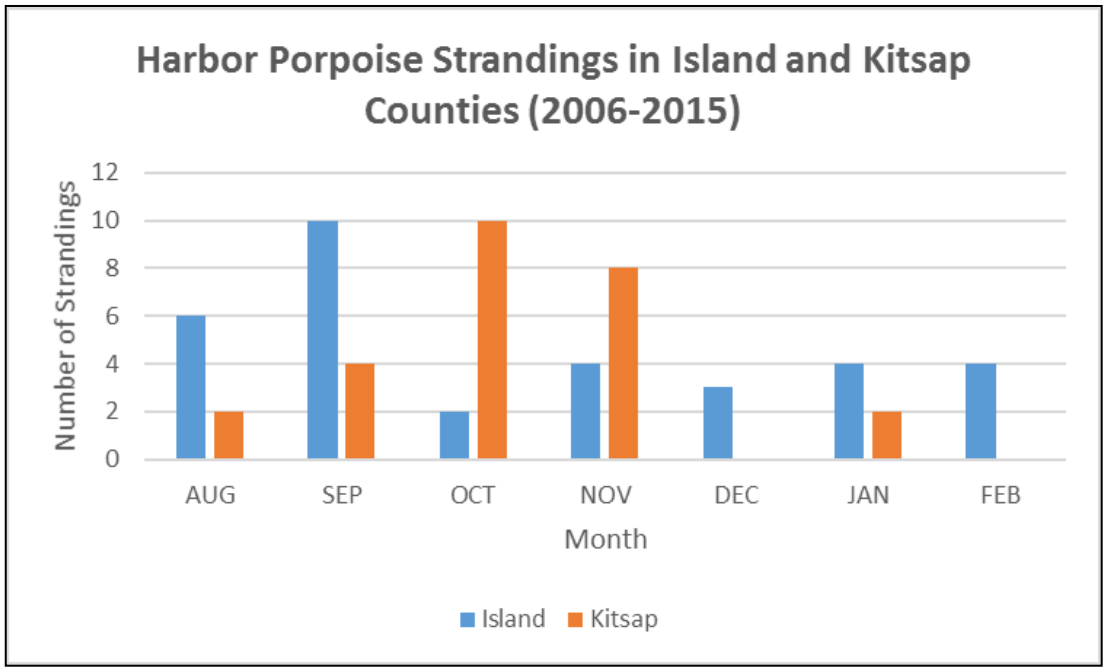

Figure 3-11. Confirmed harbor porpoise strandings in Kitsap County during the August to February work window.

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of harbor porpoise in the Edmonds Ferry Terminal area as a range between 0.061701 and 0.156000 animals/ km2 (U.S. Navy 2015).

WDFW Aerial Surveys
WDFW has carried out annual winter aerial marine bird surveys for Washington inner marine water every year from 1994 to the present (excluding 2007). In addition to marine birds, all marine mammal observations have been recorded. The survey results were used to estimate the winter mean densities of harbor porpoise by basin. The density of harbor porpoise in the Edmonds Ferry Terminal area is estimated as a range between 0 and 0.58 (WDFW/Cascadia 2016).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no harbor porpoise were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no harbor porpoise were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported eight sightings days for harbor porpoise in the red quadrants shown in Figure 3-2 (Table 3-7) (TWM 2017b).

Table 3-7. Edmonds Harbor Porpoise Sightings Days, 2010-2016

Aug	Sept	Oct	Nov	Dec	Jan	Feb
3	0	3	0	0	0	2

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were 59 harbor porpoise strandings in the Edmonds Ferry Terminal area that corresponds to the upcoming project ZOIs (Figure 3-12) (NMFS 2016b).

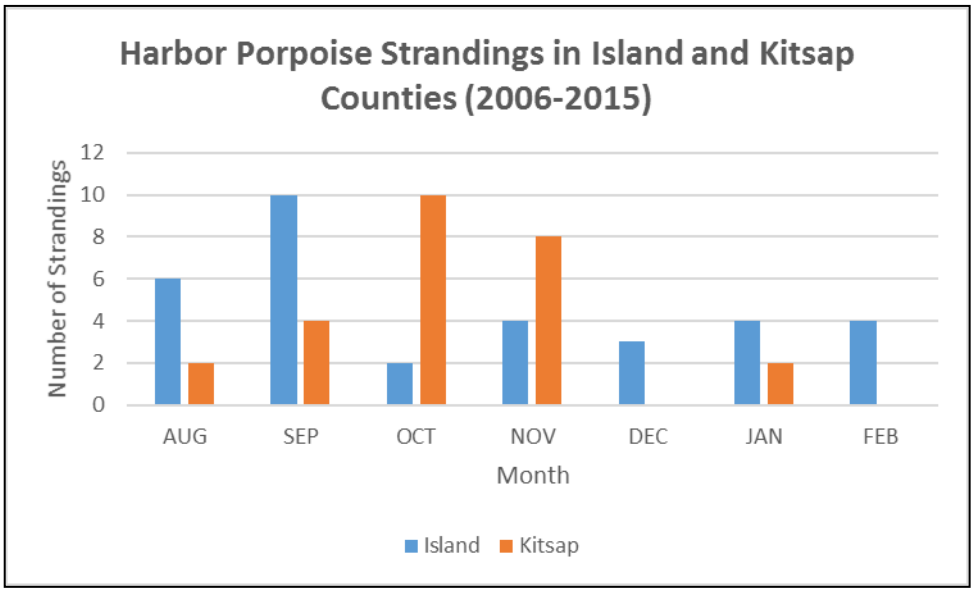

Figure 3-12. Confirmed harbor porpoise strandings in Island and Kitsap counties during the August to February work window.

3.4.6 Dall's Porpoise

The California, Oregon, and Washington Stock of Dall's porpoise may be found near the project site. Dall's porpoise are high-frequency hearing range cetaceans (Southall et. al. 2007).

3.4.6.1 Numbers

The most recent estimate of Dall's porpoise stock abundance is 25,750, based on 2008 and 2014 summer/autumn vessel-based line transect surveys of California, Oregon, and Washington waters (NMFS 2017b). Within the inland waters of Washington and British Columbia, this species is most abundant in the Strait of Juan de Fuca east to the San Juan Islands. The most recent Washington's inland waters estimate is 900 animals (Calambokidis et al. 1997), though sightings have become rarer since then. Prior to the 1940s, Dall's porpoises were not reported in Puget Sound.

3.4.6.2 Status

The California, Oregon, and Washington Stock of Dall's porpoise is "non-depleted" under the MMPA, and "unlisted" under the ESA.

3.4.6.3 Distribution

Dall's porpoises are migratory and appear to have predictable seasonal movements driven by changes in oceanographic conditions (Green et al. 1992, 1993), and are most abundant in Puget Sound during the winter (Nysewander et al. 2005; WDFW 2008). Despite their migrations, Dall's porpoises occur in all areas of inland Washington at all times of year (Calambokidis pers. comm. 2006), but with different distributions throughout Puget Sound from winter to summer. The WDFW PSAMP data show peaks in Washington waters to occur during the winter. The average winter group size is three animals (WDFW 2008).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of Dall's porpoise in the Bremerton Ferry Terminal area as a range between 0.018858 and 0.047976 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no Dall's porpoise were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for Dall's porpoise in the red and orange areas shown in Figure 3-1 (TWM 2017a).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no Dall's porpoise strandings in the area that corresponds to the upcoming Bremerton Ferry Terminal project ZOIs (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report estimates the density of Dall's porpoise in the Edmonds Ferry Terminal area as a range between 0.018858 and 0.047976 animals/ km2 (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no Dall's porpoise were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no Dall's porpoise were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for Dall's porpoise in the red quadrants shown in Figure 3-2 (TWM 2017b).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there was one Dall's porpoise stranding in the Edmonds Ferry Terminal project ZOIs (NMFS 2016b).

3.4.7 Long-beaked Common Dolphin

The California Stock of long-beaked common dolphin may be found near the project site. Long-beaked common dolphins are mid-frequency hearing range cetaceans (Southall et. al. 2007).

3.4.7.1 Numbers

Based on two ship line-transect surveys in 2008 and 2014, the minimum population estimate is 68,432 long-beaked common dolphins (NMFS 2017c).

3.4.7.2 Status

The California Stock of common bottlenose dolphin is "non-depleted" under the MMPA, and "unlisted" under the ESA.

3.4.7.3 Distribution

Long-beaked common dolphins are commonly found within about 50 nautical miles of the coast, from Baja California northward to about central California. The species is a rare visitor to Washington's coastal and inland marine waters (NMFS 2017c).

Bremerton Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report indicates that long-beaked common dolphin are not expected to occur in the Bremerton Ferry Terminal area (U.S. Navy 2015).

WSF Projects
In 2015, WSF replaced the wingwall structures at the Bremerton Ferry Terminal. Marine mammal monitoring was implemented during this project. Over eight days of monitoring in January and February of 2015, no long-beaked common dolphins were observed near the terminal (WSF 2015).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for long-beaked common dolphin in the red and orange areas shown in Figure 3-1 (TWM 2017a).

There were reported sightings elsewhere in the Puget Sound in the summer of 2016. Beginning on June 16, long-beaked common dolphins were observed near Victoria, British Columbia. Over the following weeks, a pod of 15 to 20 (including a calf) was observed in central and southern Puget Sound (Orca Network 2016).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no confirmed strandings of long-beaked common dolphin in the area that corresponds to the upcoming project ZOIs (NMFS 2016b).

Edmonds Ferry Terminal Density and Sightings

U.S. Navy Density Report
In the timeframe scheduled for this project, the report indicates that long-beaked common dolphin is not expected to occur in the Edmonds Ferry Terminal area (U.S. Navy 2015).

WSF Projects
In 2017, WSF conducted resets of three right-outer dolphin piles at the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over three days of monitoring in July 2017, no long-beaked common dolphins were observed near the terminal (R. Huey, pers. comm. 2017).

In 2017, WSF conducted resets of 36-inch diameter steel piles associated with fender structures at the Kingston Ferry Terminal. This terminal is located across Puget Sound from the Edmonds Ferry Terminal. Marine mammal monitoring was implemented during this project. Over two days of monitoring in July 2017, no long-beaked common dolphins were observed near the terminal (R. Huey, pers. comm. 2017).

The Whale Museum
For the years 2010 to 2016, in the August to February timeframe scheduled for this project, The Whale Museum reported no sightings days for long-beaked common dolphin in the red quadrants shown in Figure 3-2 (TWM 2017b).

NMFS Stranding Data
From the years 2006-2015, in the timeframe scheduled for this project, there were no confirmed strandings of long-beaked common dolphin in the area that corresponds to the upcoming project ZOIs (NMFS 2016b).

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4.0 Status and Distribution of Affected Species or Stocks

A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

This section has been combined with Section 3.0.

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5.0 Type of Incidental Take Authorization Requested

The type of incidental taking authorization that is being requested (i.e., takes by harassment only, takes by harassment, injury and/or death), and the method of incidental taking.

The MMPA defines "harassment" as:

> any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment] (50 C.F.R, Part 216, Subpart A, Section 216.3-Definitions).

Level A is the more severe form of harassment because it may result in injury or death, whereas Level B only results in disturbance *without* the potential for injury. (B. Norberg pers. comm. 2007a).

5.1 Incidental Take Authorization Request

Under Section 101 (a)(5)(D) of the MMPA, WSF requests an IHA from September 1, 2018 through February 15, 2019 for Level B incidental take (behavioral harassment) of the marine mammals described in this application during the dolphin relocation project at Bremerton and Edmonds ferry terminals.

The requested authorization is for incidental harassment of any eleven species of marine mammal that might enter the 120 dB ZOI during active vibratory pile driving or removal activity.

The scheduled pile-driving and pile-removal activities discussed in this application will occur between September 1, 2018 and February 15, 2019.

5.2 Method of Incidental Taking

The method of incidental take is Level B acoustical harassment of any marine mammal occurring within the 120 dB ZOI during active vibratory pile driving or removal activity.

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6.0 Number of Marine Mammals that May Be Affected

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in [Section 5], and the number of times such takings by each type of taking are likely to occur.

This section summarizes potential incidental take of marine mammals during the Bremerton and Edmonds Ferry Terminal Dolphin Relocation projects. Section 6.2 describes the methods used to calculate the estimated ZOI and Section 6.3 describes the potential incidental take for each marine mammal species. Section 6.4 provides the number of marine mammals by species for which take authorization is requested.

Due to the vibratory pile driving and removal source levels, this IHA application will incidentally take by Level B acoustical harassment small numbers of harbor seal, northern elephant seal, California sea lion, Steller sea lion, southern resident killer whale, transient killer whale, gray whale, humpback whale, minke whale, harbor porpoise, Dall's porpoise, and long-beaked common dolphin. With the exception of harbor seals and California sea lions, it is anticipated that all of the marine mammals that enter a Level B acoustical harassment ZOI will be exposed to pile driving noise only briefly as they are transiting the area. Only harbor seals and California sea lions are expected to forage and haul out in the Bremerton and Edmonds ferry terminal ZOIs with any frequency and could be exposed multiple times during a project.

6.1 Estimated Duration of Pile Driving/Zones of Influence and Exclustion

Durations are summarized in Section 1.4.3. Distances to the NMFS threshold for Level B (harassment) take and Level A (injury) ZOEs for vibratory installation and removal were presented in Section 1.6.6, Attenuation to NMFS Thresholds.

6.1.1 Zones of Influence/Exclusion

Table 6-2 summarizes the ZOIs/ZOEs:

Table 6-1. 30/36" Steel Vibratory Pile Driving/Removal Zones of Influence/Exclusion

Zone	Project Area	Species	Threshold	Distance to Threshold	ZOI Area (km^2)
ZOI-1	Bremerton	All*	Level B	39.8 km	13.2 km^2
ZOI-2	Edmonds	All*	Level B	63.1 km	351 km^2
ZOE-1	Both	Pinnipeds	Level A	10 m	314 m^2
ZOE-2	Both	Cetaceans	Level A	35 m	3,849 m^2

*All species, except Southern Resident Killer Whale = shutdown zones

6.1.2 Airborne Zones of Influence

Airborne noises can affect pinnipeds, especially resting seals hauled out on rocks or sand spits. In-air thresholds will be reached at the following distances:

- Noise generated during vibratory installation and/or removal of steel piles (96.9 dB at 50 feet) will reach the harbor seal in-air threshold (90 db_{RMS}) at approximately 34 m/111 ft., and is below the other pinnipeds threshold.

The nearest documented harbor seal haul out site to the Bremerton Ferry Terminal is 5.3 shoreline miles northwest within Dyes Inlet. The level of use of this haul out during the fall and winter is unknown, but is expected to be less as use of other haul outs have been shown to decrease in winter (Farrer and Acevedo-Gutierrez 2010). Harbor seals are known to haul out on docks and beaches throughout the project area.

The nearest documented California sea lion haul out site to the Bremerton Ferry Terminal is 5.4 shoreline miles east on a buoy within Rich Passage. The estimated number of California sea lions using the haul out is less than 10 (Jeffries, et al. 2000).

The nearest documented harbor seal and California sea lion haul out to the Edmonds Ferry Terminal is located on rafts and floats located 640 feet northeast of the dolphin relocation site. The estimated number of pinnipeds using this haul out is less than 100 animals (Jeffries, et al. 2000).

During vibratory pile driving and removal, temporary in-air disturbance will be limited to harbor seals swimming on the surface through the immediate terminal area, or hauled-out on beaches or boat ramps within 34 m/111ft.

6.2 Estimated Incidental Takes

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a ZOI during active pile driving or removal. Expected marine mammal presence is determined by past observations and general abundance near the Bremerton and Edmonds ferry terminals during the construction window.

Typically, potential take is estimated by multiplying the areas of the ZOIs by the local animal density. This provides an estimate of the number of animals that might occupy the ZOIs at any given moment. There are two sources of density estimates available, the U.S. Navy Marine Species Density Report (2015), and the WDFW density estimates for harbor porpoise (2016). These density estimates will be used to calculate takes, unless site-specific data is available that support a different take estimate approach.

The density-based calculation for marine mammal exposures is estimated by:

Exposure estimate = N (number of animals based on density * area) * days of pile driving/removal activity

Site-specific information that may be used includes local marine mammal data sets (e.g., The Whale Museum, state and federal agencies), opinions from state and federal agencies, observations from local area whale specialists, and best professional judgment. Calculations for take are provided in Appendix C. Take noted as 'adjusted' is based on site-specific information.

6.2.1 Southern Resident Killer Whale

Due to the critical status of Southern Resident Killer Whale (SRKW), WSF is committed to no (zero) Level A or B acoustical harassment take of SRKW (see Appendix B – Monitoring Plan).

To ensure that project take does not result in take of SRKW, the following monitoring steps will be implemented (see Appendix B – Monitoring Plan):

- The intent of monitoring is to prevent any take of SRKW.
- If SRKW approach the ZOI during vibratory pile driving or removal, work will be paused until the SRKW exit the ZOI.
- If killer whale approach the ZOI during vibratory pile driving or removal and it is unknown whether they are SRKW or Transient, it shall be assumed they are SRKW and work will be paused until the whales exit the ZOI.

6.2.2 Transient Killer Whale

The following monitoring steps will be implemented during this project (see Appendix B – Monitoring Plan):

- If positively identified Transients (as identified by Orca Network, NMFS or another qualified source) approach the ZOIs during pile removal or driving, and it is known that SRKW are not in the vicinity (from the same qualified sources) work will continue.
- If all permitted Transient killer whale takes have been used and killer whales approach the ZOIs during pile driving or removal, work shall be paused to avoid take.

6.3 Number of Takes for Which Authorization is Requested

Calculated take is conservative. The total number of requested takes for which for Level B acoustical harassment is presented in the table below:

Table 6-2. Level B Acoustical Harassment Take Requests

Species	Take Request
Harbor Seal	2,291
Northern Elephant Seal	15
California Sea Lion	1,149
Steller Sea Lion	75
SR Killer Whale	0
Transient Killer Whale	30
Gray Whale	10
Humpback Whale	8
Minke Whale	18
Harbor Porpoise	1,092
Dall's Porpoise	90
Long-beaked Common Dolphin	50

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7.0 Anticipated Impact on Species or Stocks

The anticipated impact of the activity upon the species or stock of marine mammals.

WSF is requesting authorization for Level B acoustical harassment take of marine mammals as listed in Table 6-1. Any incidental takes will very likely be multiple takes of individuals, rather than single takes of unique individuals. The stock take calculations below assume takes of individual animals, instead of repeated takes of a smaller number; therefore the stock take percentage calculations are very conservative.

These numbers in relation to the overall stock size of each species are summarized in Table 7-1.

If incidental takes occur, it is expected to only result in short-term changes in behavior and potential temporary hearing threshold shift. These takes would be unlikely to have any impact on stock recruitment or survival and therefore, would have a negligible impact on the stocks of these species.

Table 7-1. Level B Acoustical Harassment Take Request Percent of Total Stock

Species	Stock Size	Take Request	Take Request % of Stock	20% of Stock
Harbor Seal	11,036	2,291	20.8	2,207
Northern Elephant Seal	81,368	15	.02	16,274
California Sea Lion	296,750	1,149	.39	59,350
Steller Sea Lion	67,290	75	.11	13,458
SR Killer Whale	76	0	0	16
Transient Killer Whale	243	30	12.4	49
Gray Whale	20,990	10	.05	4,198
Humpback Whale	1,918	8	.42	384
Minke Whale	369	18	2.2	74
Harbor Porpoise	11,233	1,092	9.7	2,247
Dall's Porpoise	25,750	90	.40	5,150
Long-beaked Common Dolphin	101,305	50	.05	20,261

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8.0 Anticipated Impact on Subsistence

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

8.1 Subsistence Harvests by Northwest Treaty Indian Tribes

Historically, Pacific Northwest Native American tribes were known to hunt several species of marine mammals including, but not limited to harbor seals, Steller sea lions, northern fur seals, gray whales and humpback whales. More recently, several Pacific Northwest Native American tribes have promulgated tribal regulations allowing tribal members to exercise treaty rights for subsistence harvest of harbor seals and California sea lions (Carretta et al. 2007b).

The Makah Indian Tribe (Makah) has specifically passed hunting regulations for gray whales. However, the directed take of marine mammals (not just gray whales) for ceremonial and/or subsistence purposes was enjoined by the Ninth Circuit Court of Appeals in rulings against the Makah in 2002, 2003 and 2004 (Norberg pers. comm. 2007b; NMFS 2007). Currently, there are no authorized ceremonial and/or subsistence hunts for marine mammals in Puget Sound or the San Juan Islands (Norberg pers. comm. 2007b) with the possible exception of some coastal tribes who may allow a small number of directed take for subsistence purposes.

8.1.1 Harbor Seals

Tribal subsistence takes of this stock may occur, but no data on recent takes are available (NMFS 2014a). No impacts on the availability of the species or stocks to the Pacific Northwest treaty tribes are expected as a result of the proposed project.

8.1.2 California Sea Lions

Tribal subsistence takes of this stock may occur, but no data on recent takes are available (NMFS 2015c). No impacts on the availability of the species or stock to the Pacific Northwest treaty tribes are expected as a result of the proposed project.

8.1.3 Gray Whales

The Makah ceased whaling in the 1920s after commercial whaling decimated the Eastern North Pacific gray whale population (NMFS 2007). On June 16, 1994, gray whales were removed from the endangered species list after a determination that the population had “recovered to near its estimated original population size and is neither in danger of extinction throughout all or a significant portion of its range, nor likely to again become endangered within the foreseeable future throughout all or a significant portion of its range” (59 FR 31094).

On May 5, 1995, the Makah formally notified the U.S. Government of its interest in resuming treaty ceremonial and subsistence harvest of Eastern North Pacific gray whales, asking the Department of Commerce to represent them in seeking approval from the International Whaling

Commission (IWC) for an annual quota (NMFS 2007). On October 18, 1997, the IWC approved an aboriginal subsistence quota of 620 Eastern North Pacific gray whales (with an annual cap of 140) for the Russian Checotah people and the Makah (Angliss and Outlaw 2007; NMFS 2007). The Makah successfully hunted one Eastern North Pacific gray whale on May 17, 1999 (NMFS 2005).

Whaling by the Makah was halted on December 20, 2002, when the Ninth Circuit Court of Appeals ruled that an environmental impact statement rather than an environmental assessment should have been prepared under the National Environmental Protection Act and that the Makah must comply with the process prescribed in the MMPA for authorizing take of marine mammals otherwise prohibited by a moratorium. This was further upheld by rulings in 2003 and 2004 (NMFS 2007). At a 2007 meeting of the IWC (59th Annual Meeting in Anchorage, Alaska), an aboriginal subsistence quota for gray whales was again approved for natives in Russia and 20 whales (four per year for 5 years) for the Makah. But under the Ninth Circuit Court ruling the Makah must first obtain a waiver of the MMPA take moratorium before harvesting under their IWC quota (Norberg pers. comm. 2007b).

In February 2005, NMFS received a request from the Makah for a waiver of the MMPA take moratorium to resume limited hunting of Eastern North Pacific gray whales. A draft environmental impact statement (DEIS) to examine the alternatives for a decision to approve or deny the waiver was released for public comment in May 2008, but later terminated in May 2012 to begin developing a new DEIS because of substantial new scientific information. In March 2015 the new DEIS was released, and is currently in public comment (NMFS 2015b).

However, any future hunts by the Makah would occur along the outer coast of Washington, not in the Puget Sound area. Therefore, the proposed activities would not interfere with any future hunt.

9.0 Anticipated Impact on Habitat

The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat.

9.1 Introduction

Construction activities will have temporary impacts on marine mammal habitat by through increases in in-water and in-air sound pressure levels from pile driving and removal. Other potential temporary impacts are water quality (increases in turbidity levels) and prey species distribution. Best management practices (BMPs) and minimization practices used by WSF to minimize potential environmental effects from project activities are outlined in Section 11 - Mitigation Measures.

9.2 In-air Noise Disturbance to Haul Outs

The project is scheduled to begin September 1, 2018, and all harbor seal pups are weaned in this region of Puget Sound by October 1. Disturbance of pinnipeds hauled out near the project, and surfacing when swimming within the threshold distances is possible.

During vibratory pile driving and removal, temporary in-air disturbance will be limited to harbor seals swimming on the surface through the immediate terminal area, or hauled-out on beaches or boat ramps within 34 m/111 ft.

In-air noise from non-pile driving construction activities is not expected to cause in-air disturbance to pinnipeds, because the Bremerton and Edmonds ferry terminals are currently subject to similar existing levels of in-air noise from ferry, boat, road and other noise sources.

9.3 Underwater Noise Disturbance

NMFS is currently using an in-water noise disturbance threshold of 120 dB_{RMS} for pinnipeds and cetaceans for continuous noise sources, unless the site-specific background noise is higher than 120 dB_{RMS}. In that case, the higher background becomes the threshold. The distance to the Level B acoustical harassment thresholds is described in Section 1.6.4, Attenuation to NMFS Thresholds.

There are several short-term and long-term effects from noise exposure that may occur to marine mammals, including impaired foraging efficiency and its potential effects on movements of prey, harmful physiological conditions, energetic expenditures and temporary or permanent hearing threshold shifts due to chronic stress from noise (Southall et al. 2007). The majority of the research on underwater noise impacts on whales is associated with vessel and navy sonar disturbances and does not often address impacts from pile driving.

The threshold levels at which anthropogenic noise becomes harmful to killer whales are poorly understood (NMFS 2008). Because whale occurrence is occasional near the project site, in-water noise impacts are localized and of short duration, any impact on individual cetaceans and pinnipeds will be limited. Pile removal and driving will expose marine mammals to potential Level B harassment. The vibratory pile driving Zone of Exclusion (ZOE) will be monitored, and

work ceased if any marine mammal approaches the ZOE. Because there are no documented haul outs within the immediate project area, pinniped disturbance will be limited to individuals transiting the ZOI.

9.4 Water and Sediment Quality

Short-term turbidity is a water quality effect of most in-water work, including pile driving. WSF must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area.

Roni and Weitkamp (1996) monitored water quality parameters during a pier replacement project in Manchester, Washington. The study measured water quality before, during and after pile removal and driving. The study found that construction activity at the site had "little or no effect on dissolved oxygen, water temperature and salinity", and turbidity (measured in nephelometric turbidity units [NTU]) at all depths nearest the construction activity was typically less than 1 NTU higher than stations farther from the project area throughout construction.

Similar results were recorded during pile removal operations at two WSF ferry facilities. At the Friday Harbor terminal, localized turbidity levels within the regulatory compliance radius of 150 feet (from three timber pile removal events) were generally less than 0.5 NTU higher than background levels and never exceeded 1 NTU. At the Eagle Harbor maintenance facility, within 150 feet, local turbidity levels (from removal of timber and steel piles) did not exceed 0.2 NTU above background levels (WSF 2014). In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile (Everitt et al. 1980).

Cetaceans are not expected to be close enough to the Bremerton and Edmonds ferry terminals to experience turbidity, and any pinnipeds will be transiting the terminal area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals.

9.5 Passage Obstructions

Pile driving and removal at the Bremerton and Edmonds ferry terminals will not obstruct movements of marine mammals. Pile work at the terminals will occur within 500 feet of the shoreline, leaving the width of Sinclair Inlet and Puget Sound for marine mammals to pass. A construction barge may be used during the project. The barge will be anchored and/spudded. No dynamic positioning system (DPS) will be used. In a previous concurrence letter for the Vashon Island Dolphin Replacement Project (NMFS 2008b), NMFS stated the following:

> Vessels associated with any project are primarily tug/barges, which are slow moving, follow a predictable course, do not target whales, and should be easily detected by whales when in transit. Vessel strikes are extremely unlikely and any potential encounters with Southern Residents [killer whales] are expected to be sporadic and transitory in nature.

Similarly, vessel strikes are unlikely for the proposed project.

9.6 Conclusions Regarding Impacts on Habitat

The most likely effects on marine mammal habitat from the proposed project are temporary, short duration noise and water quality effects. The direct loss of habitat available to marine

mammals during construction due to noise, water quality impacts and construction activity is expected to be minimal. All cetacean species utilizing habitat near the terminal will be transiting the terminal area.

Any adverse effects on prey species during project construction will be short term. Given the large numbers of fish and other prey species in Puget Sound, the short-term nature of effects on fish species and the mitigation measures to protect fish during construction (use of a vibratory hammer, BMPs, conducting work within the approved in-water work window), the proposed project is not expected to have measurable effects on the distribution or abundance of potential marine mammal prey species.

Passage is not expected to be obstructed as a result of the proposed project. Any temporary obstruction due to barge placement will be localized and limited in duration, and a traveling barge is too slow to strike marine mammals.

10.0 Anticipated Impact of Loss or Modification of Habitat

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The proposed project will not result in a significant permanent loss or modification of habitat for marine mammals or their food sources. The most likely effects on marine mammal habitat for the proposed project are temporary, short duration in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during the project is expected to be minimal. These temporary impacts have been discussed in detail in Section 9.0, Anticipated Impact on Habitat.

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11.0 Mitigation Measures

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

WSF activities are subject to federal, state and local permit regulations. WSF has developed and routinely uses the best guidance available (e.g., BMPs and mitigation measures) to avoid and minimize (to the greatest extent possible) impacts on the environment, ESA species, designated critical habitats and species protected under the MMPA.

The mitigation measures will be employed during all pile driving activities at the Bremerton and Edmonds ferry terminals. The language in each mitigation measure is included in the Contract Plans and Specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the Contractor and WSF. Failure to follow the prescribed mitigation measures is a contract violation.

General mitigation measures used for all construction practices are listed first (Section 11.1, All Construction Activities), followed by specific mitigation measures for pile related activities (Section 11.2, Pile Removal and Installation). The mitigation measures listed under Section 11.1 apply to different activities and are, therefore, listed additional times where appropriate.

11.1 All Construction Activities

All WSF construction is performed in accordance with the current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. Special Provisions contained in preservation and repair contracts are used in conjunction with, and supersede, any conflicting provisions of the Standard Specifications. Mitigation measures include:

- All construction equipment will comply with applicable equipment noise standards of the U.S. Environmental Protection Agency, and all construction equipment will have noise control devices no less effective than those provided on the original equipment.
- WSF will have a WSF inspector on site during construction. The role of the inspector is to ensure contract compliance. The inspector and the contractor will have a copy of the Contract Plans and Specifications on site and will be aware of all requirements. The inspector will also be trained in environmental provisions and compliance.
- WSF will obtain Hydraulic Project Approval (HPA) from WDFW as appropriate and the contractor will follow the conditions of the HPA. HPA requirements will be listed in the contract specifications, and will be a legal requirement of the contract.
- The contractor shall be responsible for the preparation of a Spill Prevention, Control and Countermeasures (SPCC) plan to be used for the duration of the project:
- The plan shall be submitted to the Project Engineer prior to the commencement of any construction activities. A copy of the plan with any updates will be maintained at the work site by the contractor.

- The SPCC plan shall identify construction planning elements and recognize potential spill sources at the site. The SPCC plan shall outline BMPs, responsive actions in the event of a spill or release and identify notification and reporting procedures. The SPCC plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections and training.
- The SPCC will outline what measures shall be taken by the contractor to prevent the release or spread of hazardous materials, either found on site and encountered during construction but not identified in contract documents, or any hazardous materials that the contractor stores, uses, or generates on the construction site during construction activities. These items include, but are not limited to gasoline, oils and chemicals. Hazardous materials are defined in Revised Code of Washington (RCW) 70.105.010 under "hazardous substance."
- The contractor shall maintain, at the job site, the applicable spill response equipment and material designated in the SPCC plan.
- The contractor shall regularly check fuel hoses, oil drums, oil or fuel transfers valves, fittings, etc. for leaks, and shall maintain and store materials properly to prevent spills.
- No petroleum products, chemicals or other toxic or deleterious materials shall be allowed to enter surface waters.
- WSF will comply with water quality restrictions imposed by the Washington State Department of Ecology (Ecology) (Chapter 173-201A WAC), which specify a mixing zone beyond which water quality standards cannot be exceeded. Compliance with Ecology's standards is intended to ensure that fish and aquatic life are being protected to the extent feasible and practicable.
- Wash water resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged into state waters unless authorized through a state discharge permit.
- Equipment that enters the surface water shall be maintained to prevent any visible sheen from petroleum products appearing on the water.
- There shall be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
- No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
- The contractor shall regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. for leaks, and shall maintain and store materials properly to prevent spills.

11.2 Timing Windows

In-water construction at the Bremerton Ferry Terminal will commence after October 1, and is planned during the August 1, 2018 to February 15, 2019 in-water work window for Tidal Reference Area 5. In-water construction at the Edmonds Ferry Terminal will commence October 1, and is planned during the July 15, 2018 to February 15, 2019 in-water work window for Tidal Reference Area 6 (WAC 220-660-330).

11.3 Pile Removal BMPs

The following pile removal mitigation measures are proposed by WSF to reduce impacts on marine mammals to the lowest extent practicable. For WSF's Construction Minimization Measures, see WSF Biological Assessment Reference Section 2.3. Additional BMPs that will be incorporated into the project include:

- The vibratory hammer method will be used to remove timber piles to minimize noise levels.
- Hydraulic water jets will not be used to remove piles.
- Marine mammal monitoring during vibratory pile removal will be employed for the Level B ZOI (see Section 11.5, Marine Mammal Monitoring).
- The crane operator will be instructed to remove piles slowly to minimize turbidity in the water as well as sediment disturbance.
- The operator will "wake up "the pile to break the bond with surrounding sediment by vibrating the pile slightly prior to removal. Waking up the pile avoids pulling out large blocks of sediment, which could cause the pile to break apart during the removal process, and usually results in little to no sediment attached to the pile during withdrawal.
- Extraction equipment will be kept out of the water, above the water line, to prevent creosote release into the water that could occur if the pile is pinched by extraction equipment below the water line.
- Piling will not be broken off intentionally by twisting, bending, or other deformation, to minimize any potential release of creosote into the water column.
- Treated wood will be contained during and after removal to preclude sediments and contaminated materials from entering the aquatic environment.
- The work surface on the barge deck or pier will include a containment basin for pile and any sediment removed during pulling. The basin will be constructed of durable plastic sheeting with sidewalls supported by hay bales or a support structure to contain all sediment. The containment basin shall be removed and disposed of in accordance with applicable federal and state regulations.
- The work surface shall be cleaned by properly disposing of sediment or other residues along with cut-off piling.
- Upon removal from the substrate the pile shall be moved immediately from the water into the containment basin. The pile shall not be shaken, hosed-off, stripped or scraped off,

left hanging to drip or any other action intended to clean or remove adhering material from the pile.

- Holes left when removing piling will be filled with clean sand or gravel. Sand or gravel used as fill material will be obtained from a commercial source that is free of contaminants.
- During removal of creosote-treated piles, containment booms and absorbent booms (or other oil-absorbent fabric) will be placed around the perimeter of the work area to capture wood debris, oil, and other materials that could inadvertently be released into marine waters. All accumulated debris will be collected daily and disposed of at an approved upland site.
- Removed creosote-treated piles will be disposed of in a manner that precludes their further use. Piles will be cut into manageable lengths (four feet or less) for transport and disposal in an approved upland location that meets the liner and leachate standards contained in the Washington Administrative Code (WAC), Chapter 173-304, Minimum Functional Standards. No reuse of treated wood will occur.
- Work barges and dredged material disposal barges will not be allowed to ground out or rest on the substrate, or be over or within 25 feet of vegetated shallows (except where such vegetation is limited to state-designated noxious weeds).
- Barges will not be anchored over vegetated shallows for more than 24 hours.
- Demolition and construction materials shall not be stored where high tides, wave action, or upland runoff can cause materials to enter surface waters.

11.4 Pile Driving BMPs

BMPs to be employed during pile installation include:

- The vibratory hammer method will be used to the extent possible to drive steel piles to minimize noise levels. Barges will not be anchored over vegetated shallows for more than 24 hours.
- Creosote-treated timber piling shall be replaced with non-creosote-treated piling.
- The contractor will be required to retrieve any floating debris generated during construction. Any debris in the containment boom will be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris will be disposed of at an upland disposal site.
- Steel, plastic/steel, concrete, or ACZA-treated wood piling will be used. No creosote-treated timber piling will be used.

11.5 Safety Zone/Zone of Exclusion

The purpose of the safety zone/Zone of Exclusion (ZOE) is to ensure that noise-generating activities are shut down before Level A harassment take occurs from cetaceans or pinnipeds

entering a relevant ZOE while vibratory pile driving is active. WSF will establish exclusion zones that correspond to the Level A harassment distances (Table 11-1).

Table 11-1. Bremerton/Edmonds ZOEs/Shutdown Zones

Zone	Species	Threshold	Distance to Threshold	ZOI Area (km^2)
ZOE-1	Pinnipeds	Level A	10 m	314 m^2
ZOE-2	Cetaceans	Level A	35 m	3,849 m^2

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12.0 Arctic Subsistence Uses, Plan of Cooperation

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. A plan must include the following:

(i) A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

(ii) A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;

(iii) A description of what measures the applicant has taken an/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and

(iv) What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting activity, to resolve conflicts and to notify the communities of any changes in the operation.

This section is not applicable. The proposed activities will take place in Washington State, specifically in Puget Sound. No activities will take place in or near a traditional Arctic subsistence hunting area.

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13.0 Monitoring and Reporting Plan

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

13.1 Coordination

WSF will conduct briefings with the construction supervisors and the crew, and marine mammal observer(s) prior to the start of pier removal to discuss marine mammal monitoring protocol and requirement to halt work.

Prior to the start of pile driving, the Orca Network and/or Center for Whale Research will be contacted to find out the location of the nearest marine mammal sightings. Daily sightings information can be found on the Orca Network Twitter site (https://twitter.com/orcanetwork), which will be checked several times a day.

The Orca Sightings Network consists of a list of over 600 (and growing) residents, scientists, and government agency personnel in the U.S. and Canada. Sightings are called or emailed into the Orca Network and immediately distributed to other sighting networks including: the Northwest Fisheries Science Center of NOAA Fisheries, the Center for Whale Research, Cascadia Research, the Whale Museum Hotline and the British Columbia Sightings Network.

'Sightings' information collected by the Orca Network includes detection by hydrophone. The SeaSound Remote Sensing Network is a system of interconnected hydrophones installed in the marine environment of Haro Strait (west side of San Juan Island) to study orca communication, in-water noise, bottomfish ecology and local climatic conditions. A hydrophone at the Port Townsend Marine Science Center measures average in-water sound levels and automatically detects unusual sounds. These passive acoustic devices allow researchers to hear when different marine mammals come into the region. This acoustic network, combined with the volunteer (incidental) visual sighting network allows researchers to document presence and location of various marine mammal species.

With this level of coordination in the region of activity, WSF will be able to get real-time information on the presence or absence of whales before starting any pile removal or driving.

13.2 Visual Monitoring

WSF has developed a monitoring plan that will collect sighting data for each marine mammal species observed during pile driving and removal activities. Monitoring for marine mammal presence will take place 30 minutes before, during, and 30 minutes after pile removal.

Marine mammal behavior, overall numbers of individuals observed, frequency of observation and the time corresponding to the daily tidal cycle will also be included. Qualified marine mammal observers will be present on site during pile removal. A monitoring plan is provided in Appendix B.

13.3 Reporting Plan

WSF will provide NMFS with a draft monitoring report within 90 days of the conclusion of monitoring. This report will detail the monitoring protocol, summarize the data recorded during monitoring and estimate the number of marine mammals that may have been harassed.

If comments are received from the Regional Administrator on the draft report, a final report will be submitted to NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

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14.0 Coordinating Research to Reduce and Evaluate Incidental Take

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

In-water noise generated by pile removal and driving at the project site is the primary issue of concern relative to local marine mammals. WSF has conducted research on sound propagation from vibratory and impact hammers, and plans on continuing that research to provide data and new technologies for future ferry terminal projects. Vibratory noise will be monitored during the project, in order to collect further data.

As described in Section 13, WSF will coordinate with local marine mammal sighting networks (Orca Network and/or the Center for Whale Research) to gather information on the location of whales prior to initiating pile removal. Marine mammal monitoring will be conducted to collect information on presence of marine mammals within the ZOIs for this project.

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Appendix A
Project Sheets

Appendix B
Marine Mammal Monitoring Plan

Bremerton and Edmonds Ferry Terminals Dolphin Relocation Project

Marine Mammal Monitoring Plan

March 2018

In accordance with the March 2018, Washington State Ferries Bremerton-Edmonds Ferry Terminal Dolphin Relocation Project Incidental Harassment Authorization Request, marine mammal monitoring will be implemented during this project.

Qualified Protected Species Observers (PSOs) will be present on site at all times during pile removal and driving. Marine mammal behavior, overall numbers of individuals observed, frequency of observation, and the time corresponding to the daily tidal cycle will be recorded.

The project includes vibratory removal and/or driving of 30-inch and 36-inch diameter hollow steel piles. Summaries of distances to injury (Table 1) and harassment (Table 2) thresholds are provided below:

Table 1. ZOI/ZOE (Shutdown) Zones

Zone	Project Area	Species	Threshold	Distance to Threshold	ZOI Area (km^2)
ZOI-1	Bremerton	All*	Level B	39.8 km	13.2 km^2
ZOI-2	Edmonds	All*	Level B	63.1 km	351 km^2
ZOE-1	Both	Pinnipeds	Level A	10 m	314 m^2
ZOE-2	Both	Cetaceans	Level A	35 m	3,849 m^2

*All species, except Southern Resident Killer Whale = shutdown zones

ZOI Sound Source Verification (SSV) During Construction (Edmonds)

In-water noise measurements of vibratory pile driving and removal will be taken during the Edmonds project to determine if the ZOI need to be modified. The Bremerton project is land-constrained, and measurements are unlikely to significantly change the modeled ZOI. If the Edmonds ZOI is modified, the marine mammal monitoring plan will be adjusted to ensure that harassment take is adequately monitored. If the Edmonds SSV verifies that the actual vs. modeled ZOI is 15 km or less, then the Marrowstone Island and the Mukilteo Ferry positions will be eliminated.

Monitoring to Estimate Level B Take Levels and Prevent Level A Take

WSF proposes the following Marine Mammal Monitoring Plan in order to prevent Level A injury take in the ZOE, and to estimate Level B harassment take in the ZOIs:

- During all vibratory driving/removal at the Bremerton terminal, two land-based PSOs, and one monitoring boat with one PSO and boat operator will monitor the ZOI.
- During all vibratory driving/removal at the Edmonds terminal, five land-based PSOs, and two ferry-based PSOs will monitor the ZOI.
- If weather prevents safe use of the boat in the Edmonds portion of the ZOI, a boat will be used in other areas of the ZOI that are safe, such as areas where lack of public access prevents stationing a land-based PSO.
- To verify the required monitoring distance, the ZOI will be determined by using a range finder or hand-held global positioning system device.
- The ZOI will be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile removal activity.
- Monitoring will be continuous unless the contractor takes a significant break, in which case, monitoring will be required 30 minutes prior to restarting pile removal.

Monitoring to Prevent Killer Whale Take

WSF proposes the following measures to prevent SRKW Level B acoustical harassment take:

- If SRKW (as identified by Orca Network, NMFS or another qualified source) approaches the relevant ZOI during pile removal or driving, work will be paused until the SRKW exit the ZOI to avoid harassment take.
- If killer whales approach the ZOI during pile removal or driving, and it is unknown whether they are SRKW or transient, it shall be assumed they are SRKW in order to prevent SRKW harassment take.

Minimum Qualifications for Protected Species Observers

Qualifications for PSOs include:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target.

- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).

- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.

- Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.

- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).

- Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction, dates and times when observations were conducted; dates and times when in water construction activities were conducted; dates and times when marine mammals were present at or within the Level B acoustical harassment ZOI; dates and times when pile removal was paused due to the presence of marine mammals.

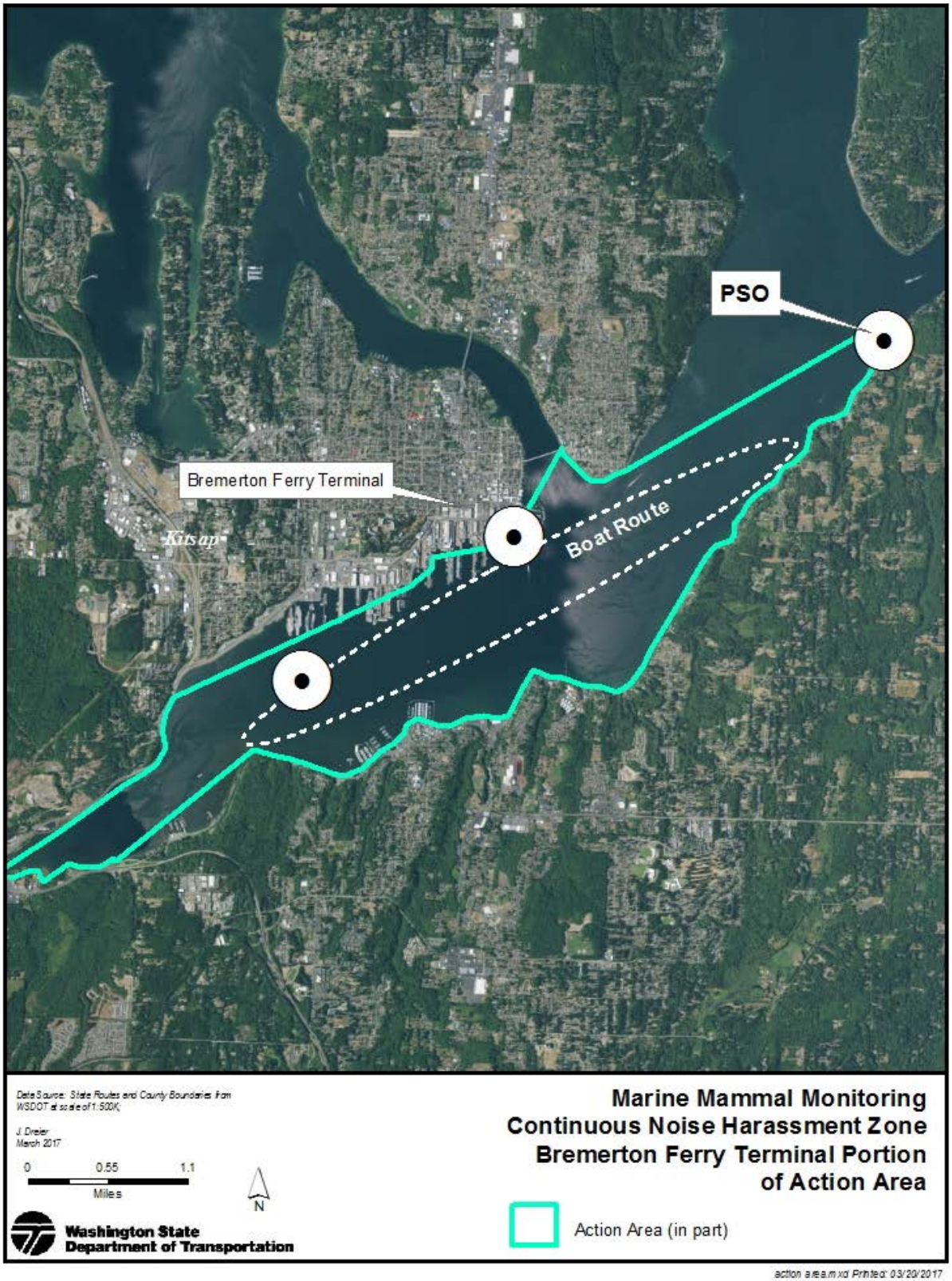

Figure 1. Bremerton monitoring locations during vibratory driving/removal of 30- and 36-inch diameter steel piles (ZOI-1).

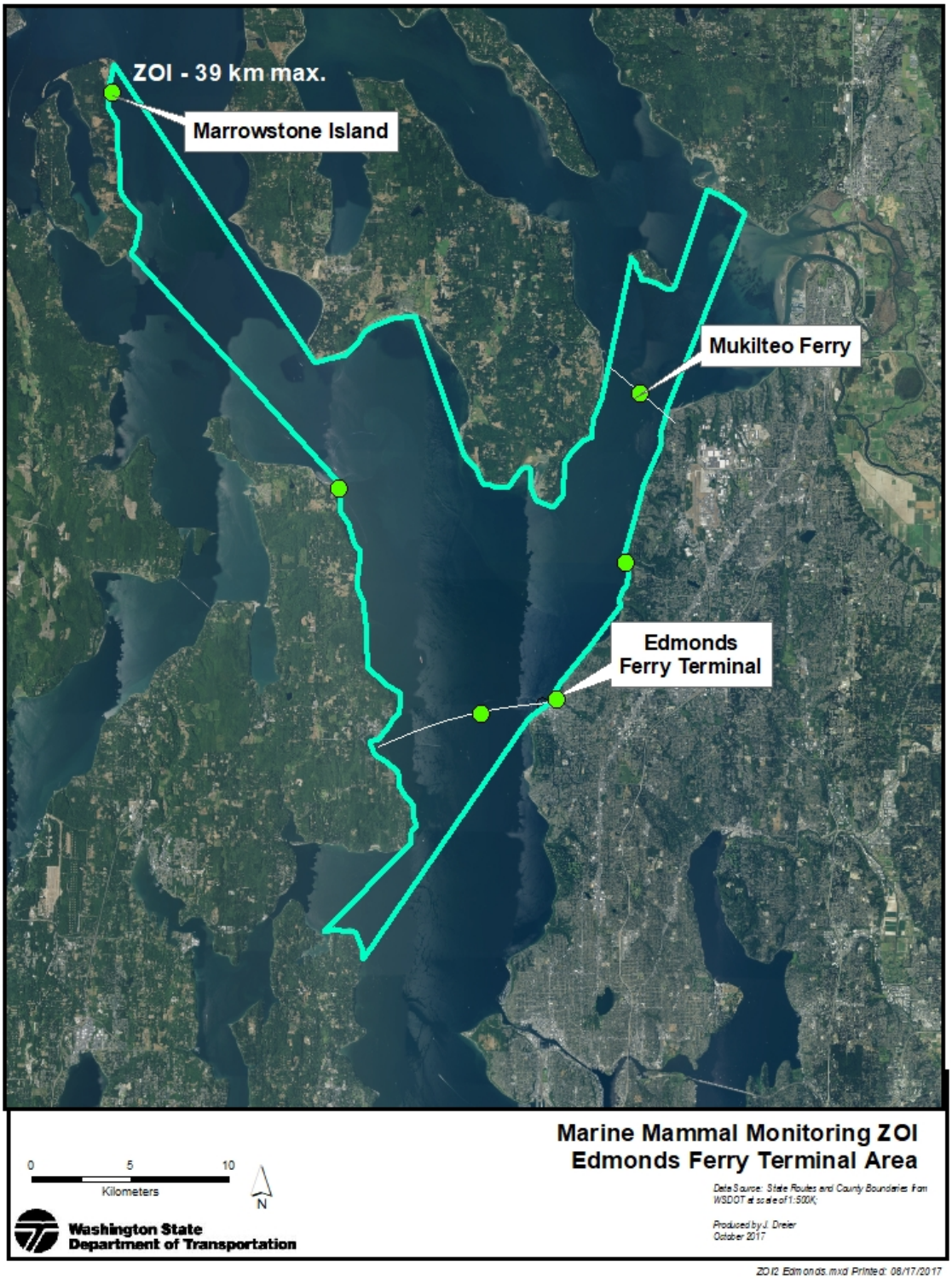

Figure 2. Edmonds monitoring locations during vibratory driving/removal of 30- and 36-inch diameter steel piles (ZOI-2).

Figure 3. ZOE monitoring locations during vibratory driving/removal of 30- and 36-inch diameter steel piles (Bremerton).

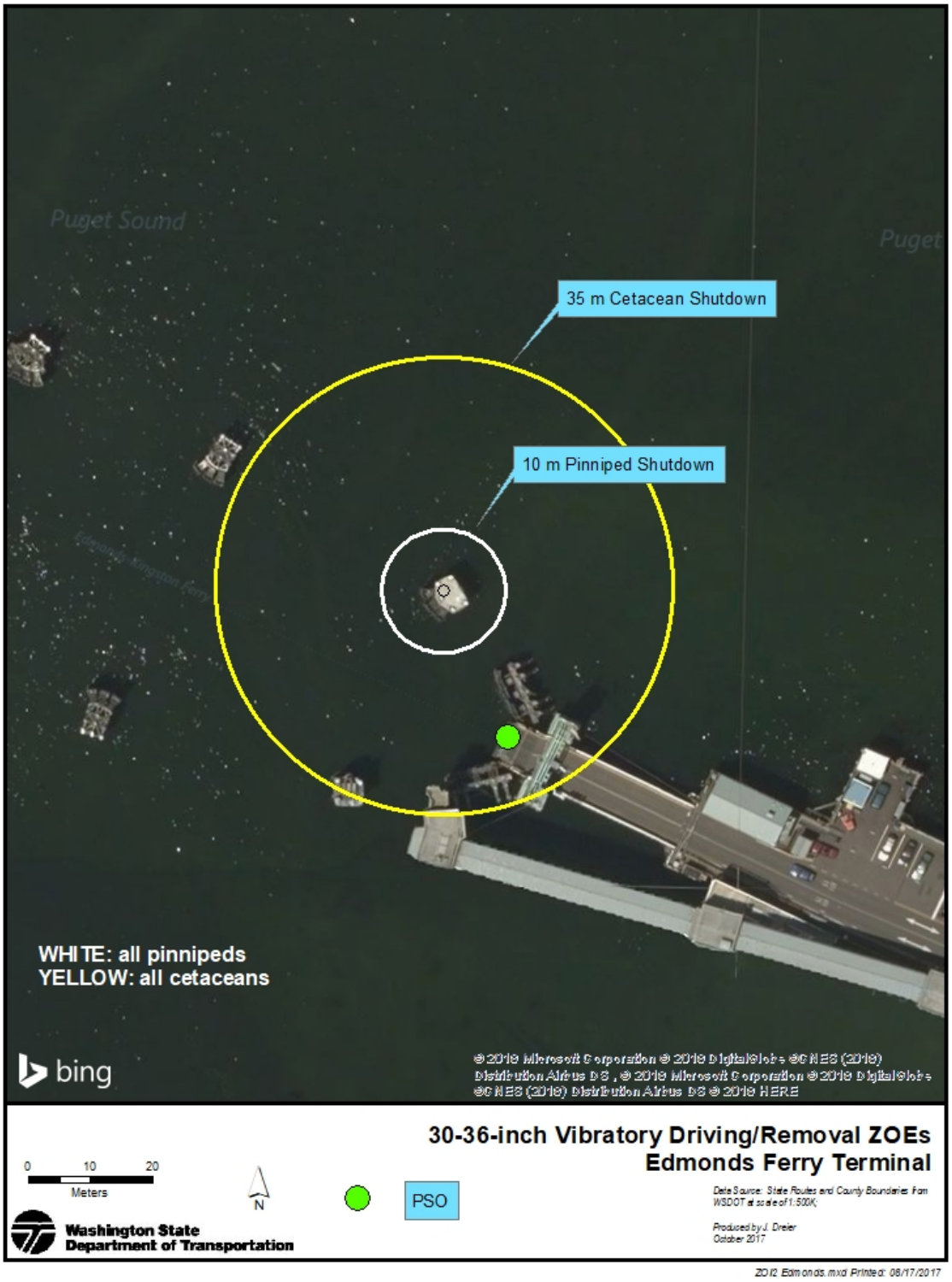

Figure 4. ZOE monitoring locations during vibratory driving/removal of 30- and 36-inch diameter steel piles (Edmonds).